APPENDIX A
REFERENCES

(BV, 2010) Black & Veatch. *Urban Water Management Plan 2010*. Prepared for Calleguas Municipal Water District. February 2011.

(BV, 2005) Black & Veatch. *2005 Urban Water Management Plan*. Prepared for Calleguas Municipal Water District. September 2005.

(Carollo, 2010) Carollo Engineers. *Engineering Compliance Report.* Prepared for Camarillo Sanitation District. January 2011.

(Camarillo, 2009) City of Camarillo, Department of Community Development . *General Plan Annual Report for Year 2009*. March 2010.

(Camarillo, 2010) City of Camarillo. "Camarillo Sanitary District". Accessed 18 March 2011. [http://www.ci.camarillo.ca.us/main.aspx?p=6083]

(CUWCC, 2010) California Urban Water Conservation Council [http://bmp.cuwcc.org/bmp/default.htm]

(CIMIS, 2010) California Irrigation Management Information System, Department of Water Resources, *Office of Water Use Efficiency*. [www.cimis.water.ca.gov]

(DWR 2010a) State of California Department of Water Resources (DWR). *Bulletin 118: California's Groundwater Bulletin.* Updated 2003. Accessed 22 October 2010. [http://www.water.ca.gov/groundwater/gwmanagement/court_adjudications.cfm]

(DWR 2010b) State of California Department of Water Resources (DWR). *Bulletin 160: California Water Plan Update 2005.* Accessed 22 October 2010. [http://www.water.ca.gov/groundwater/gwmanagement/court_adjudications.cfm]

(EIP, 2008) EIP Associates. *Springville Specific Plan.* Prepared for City of Camarillo. January 2008.

(FCGMA, 2007) Steven Bachman. *2007 Update to the Fox Canyon Groundwater Management Agency Groundwater Management Plan*. Prepared for Fox Canyon Groundwater Management Agency. May 2007.

(SCAG, 2010) Southern California Association of Governments, *Integrated Growth Forecast*. [http://www.scag.ca.gov/forecast/index.htm]

(RMP, 2005) Risk Management Professionals. *Urban Water Management Plan 2005*. Prepared for City of Camarillo. December 2005.

(USCB, 2000) United States Census Bureau. *Census 2000 Summary File*. Retrieved November 2010. [http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program =DEC&_submenuId=&_lang=en&_ts=]

(WRCC, 2010) Western Regional Climate Center. *Monthly average weather data from May 1998 to July 2010*. [http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6572]

This Page Left Blank Intentionally

PUBLIC REVIEW AND ADOPTION MATERIALS

In later versions of this report, this Appendix will include the following materials:

Notification of Public Hearing (sent to cities and county)
Notification of Public Hearing (posted in newspaper)
Resolution of Intent to Adopt
Resolution of Adoption

This Page Left Blank Intentionally

APPENDIX C

GROUNDWATER BASIN INFORMATION

This Page Left Blank Intentionally

2007 Update to the Fox Canyon Groundwater Management Agency Groundwater Management Plan

Prepared by

Fox Canyon Groundwater Management Agency
United Water Conservation District
Calleguas Municipal Water District

May 2007

ACKNOWLEDGEMENTS

This Groundwater Management Plan was prepared by Steven Bachman, with extensive advice and reviews by Fox Canyon Groundwater Management Agency staff (Jeff Pratt, Gerhardt Hubner, Gerard Kapuscik, Christian Laber, David Panaro, and Sheila Lopez) and United Water Conservation District staff (Dana Wisehart, Ken Turner, Dan Detmer, Jim Kentosh, Murray McEachron, Pete Dal Pozzo, and John Dickenson). Lowell Preston (formerly of FCGMA), Curtis Hopkins (for Municipal and Industrial [M&I] providers), Rob Saperstein (for City of Oxnard), John Mathews (for Pleasant Valley County Water District), Tony Emmert (City of Oxnard), Lucia McGovern (City of Camarillo), John Powell (Saticoy Country Club), David Borchard (FCGMA Board Member), and Lawrence (Larry) Fuller provided additional comments and reviews.

EXECUTIVE SUMMARY

The Fox Canyon Groundwater Management Agency (FCGMA) was initially created to manage the groundwater in both overdrafted and potentially seawater-intruded areas within Ventura County. The prime objectives and purposes of the FCGMA are to preserve groundwater resources for agricultural, municipal, and industrial uses in the best interests of the public and for the common benefit of all water users. Protection of water quality and quantity along with maintenance of long-term water supply are included in those goals and objectives.

Initial goals of the FCGMA included balancing water supply and demand in the Upper Aquifer System (UAS) by the year 2000 and in the Lower Aquifer System (LAS) by year 2010. These goals and the FCGMA's basic purpose remain relatively unchanged today. The initial Groundwater Management Plan for the FCGMA was prepared in 1985. This current document is an update to that initial Plan. Since preparation of the initial Plan, significantly more is now known about the occurrence of the seawater intrusion and basin overdraft through focused monitoring programs, studies, and modeling. There has also been a period of time to observe how FCGMA policies and water conservation facilities have improved groundwater conditions.

The goals of this Management Plan are to set specific, measurable management objectives for each basin, identify strategies to reach these goals, and set future FCGMA policy to help implement these strategies. The FCGMA cannot itself build and operate conservation facilities, so the focus of this Plan is both on potential FCGMA policies and on strategies and policies that can assist in implementing conservation projects by other agencies. Thus, the FCGMA acts as a partner with the other agencies in improving conditions in the aquifers within the Agency.

The main focus of the initial Groundwater Management Plan was to contain seawater intrusion in the south Oxnard Plain basin. The combination of FCGMA policies and new water conservation facilities, which included the FCGMA pumping reductions, shifting of pumping from the Upper Aquifer System to the Lower Aquifer System, the construction of the Freeman Diversion, and the operation of the Pumping Trough and Pleasant Valley pipeline systems, has had a significant effect on seawater intrusion in at least a portion of the aquifers. The most significant effect was the reduction of the lobe of seawater in the Upper Aquifer System at Port Hueneme. Monitoring wells drilled into this lobe indicate that seawater intrusion has retreated and is no longer detectable in some areas near Port Hueneme, with groundwater in one well improving from near-seawater back to drinking-quality water.

However, the containment of saline waters is not complete. In the Pleasant Valley and south Oxnard Plain basins, saline waters both from the ocean and from adjacent fine-grained sediments have expanded the area of saline intrusion since 1985. This increase occurred in the Upper Aquifer System near Point Mugu and the Lower Aquifer System in the Port Hueneme and Point Mugu areas. Thus, continuation of current strategies and the implementation of additional strategies are required to fully contain saline intrusion.

Additional water quality problems have also been identified since the original FCGMA Plan was adopted. These include increasing chlorides and other salts in the South Las Posas basin and locally in the Pleasant Valley basin, as well as increased nitrates in the Forebay basin during periods of reduced rainfall and groundwater recharge.

This 2007 Update to the FCGMA Groundwater Management Plan discusses and reviews a number of aspects of groundwater management:

- background information on the groundwater basins;
- history of groundwater extractions within the FCGMA;
- water quality issues, both generally and basin-by-basin,
- basin management objectives to indicate the health of the basin and the efficacy of current and future management strategies;
- the yield of the groundwater basins;
- current management strategies and their effectiveness;
- management strategies under development and their potential effectiveness;
- potential future management strategies and their potential effectiveness; and
- recommended actions to be taken by the FCGMA.

In addition, three appendices include:

- progression of saline intrusion in the Upper and Lower Aquifers;
- description of the Ventura Regional Groundwater Model that was used to evaluate management strategies, as well as details of those evaluations; and
- East Las Posas Basin Management Plan, which deals with issues specific to that basin and that will be adopted as part of this Groundwater Management Plan.

Basin Management Objectives (BMOs) are defined for the basins within the FCGMA in this Plan. The BMOs are measurable groundwater elevation and water quality goals that, if reached, protect the aquifers from further saline intrusion and other water quality problems. The BMOs are set at particular key wells in the groundwater basins. Current groundwater conditions meet the BMO criteria in some, but not all of the basins. They fail to meet BMOs in the Lower Aquifer and portions of the Upper Aquifer in the Oxnard Plain and Pleasant Valley basins, periodically in the Forebay basin, and locally in the Las Posas and Santa Rosa basins. Using the Ventura Regional Groundwater Model to evaluate the effectiveness of management strategies into the future, current management strategies are predicted to meet BMOs for groundwater elevations 51% of the time in the Upper Aquifer and only 5% of the time in the Lower Aquifer[*].

The annual yield of the basins within the FCGMA was calculated to be about 120,000 acre-feet (AF) for the 1985 Groundwater Management Plan. Current pumping within the FCGMA has decreased to something close to that number, however, and BMOs are not being met in key areas – which is consistent with the groundwater model results discussed in the previous paragraph. To recalculate the yield of the basin, groundwater pumping was progressively reduced in the model until BMOs were met on average 50% or more of the time. Pumping would have to be reduced to 100,000 acre-feet per year (AFY) to meet the BMOs, providing that these additional reductions were accomplished largely in the south Oxnard Plain and Pleasant Valley basins.

Because current management strategies are not sufficient to meet BMOs and pumping needs to be reduced to 100,000 AFY, additional management strategies need to be implemented. A series of these additional strategies are proposed in this Plan. Some of these strategies are currently being developed, whereas others would be implemented in the future. For strategies

[*] Percentage is based on the average number of quarters when BMOs are met at each BMO well during the 55-year modeling period of the Ventura Regional Groundwater Model. For an initial target, it is proposed that groundwater elevation BMOs be met at least 50% of the time, thus taking into account that climatic cycles will cause groundwater elevations to rise and fall periodically above and below these objectives.

that were amenable to being evaluated using the Ventura Regional Groundwater Model, the effectiveness in meeting BMOs was calculated.

The following table summarizes the proposed strategies; the strategies are grouped initially by when they could be implemented and secondarily within each time increment by their potential effectiveness in managing the basins and meeting BMOs.

Strategies Currently Under Development

- GREAT Project (recycled water for in-lieu delivery and direct injection)
- South Las Posas Pump/Treat (pump poor quality water and blend/treat it)
- Development Brackish Groundwater, Pleasant Valley (similar to previous, pumping from northern Pleasant Valley basin)
- Non-Export FCGMA Water (water pumped within FCGMA and applied in adjacent areas outside the Agency)
- Continuation of 25% Pump Reduction (continue original Plan strategy of 25% reductions by 2010)
- RiverPark Recharge (additional Santa Clara River recharge)

5-Year Strategies

- 5-Year Update of Plan
- Shift Pumping to UAS (prepare technical basis and policy)
- Protect Recharge (protect current sources of recharge)
- Limit Nitrates in the Forebay (land use, Best Management Practices)
- Recovery of Credits from the Forebay (uniform policy)
- Verification of Extraction Reporting (verify accuracy of reporting)
- Separate Strategies for Each Basin (as needed)
- FCGMA Boundary (adjust slightly to reflect new hydrogeologic understanding)
- Irrigation Efficiency (determine if warrants modifications)
- Additional Storage Projects (to help fill overdrafted basins)
- Penalties Used to Purchase Replacement Water (refill overpumped areas)
- Additional Water Conservation (encourage local agencies)
- Shelf Life for Conservation Credits (limit the long-term accumulation of credits and/or limit number of credits pumped in any one year)

10-Year Strategies

- Additional In-lieu Deliveries to South Oxnard Plain
- Import Additional State Water (for direct or in-lieu recharge)
- Further Destruction of Abandoned or Leaking Wells
- Additional Monitoring Needs (as needed to track saline intrusion or other groundwater issues)

15-Year Strategies

- Barrier Wells in South Oxnard Plain
- Injection of Treated River Water into Overdrafted Basins
- Increase Diversions from Santa Clara River (additional water rights from peak storm flows)
- Shift Pumping to Northwest Oxnard Plain

Greater Than 15-Year Strategies

- Additional Reductions in Pumping Allocations (if strategies are not fully implemented or if they fail to meet BMO targets)

The Ventura Regional Groundwater Model was used to evaluate the effect of individual strategies, as well as the combination of strategies. If all the strategies are implemented as recommended (especially those ranked highest in each time horizon), the model predicts that BMOs for the Upper Aquifer will be met 67% of the time and BMOs for the Lower Aquifer will be met 76% of the time – a major improvement that would likely halt further degradation of groundwater quality.

This management plan calls for a set of actions to implement the recommended strategies. Some of these strategies can be implemented directly by the FCGMA through policy additions or modifications. Other strategies, especially those requiring infrastructure to be built, will be largely the responsibility of other organizations. To ensure that all the strategies are implemented as seamlessly as possible, it is recommended that there be a joint Strategic Planning and Implementation effort with the other agencies that will help implement the strategies in this Plan.

The importance of implementing the strategies in this Plan is illustrated by three potential choices that are available to the FCGMA, organizations, and groundwater pumpers:

- Implementation of recommended strategies in this Plan –resulting in major improvement in overdraft conditions and the potential halt in further degradation of groundwater quality; or
- Most effective strategies not implemented because of cost, lack of cooperation, lack of will – resulting in further FCGMA reductions in pumping allocations. Reductions of an additional 85% of pumping in the south Oxnard Plain and Pleasant Valley basins would be required to meet BMOs; or
- No effective management strategies are implemented and there are no further reductions in pumping allocations – the Lower Aquifer in the south Oxnard Plain and Pleasant Valley basins will degrade until it can no longer be pumped without expensive treatment prior to delivery of the groundwater.

TABLE OF CONTENTS

1.0 INTRODUCTION

The Fox Canyon Groundwater Management Agency (FCGMA) (Figure 1 and Plate 1) is located in Ventura County and encompasses several coastal basins that underlie the cities of Oxnard, Port Hueneme, Camarillo, and Moorpark. The Agency overlies about 118,000 acres (185 sq mi). The FCGMA was initially created to manage the groundwater in both overdrafted and potentially seawater-intruded areas within Ventura County. The prime objectives and purposes of the FCGMA are to preserve groundwater resources for agricultural, municipal, and industrial uses in the best interests of the public and for the common benefit of all water users. Protection of water quality and quantity along with maintenance of long-term water supply are included in those goals and objectives.

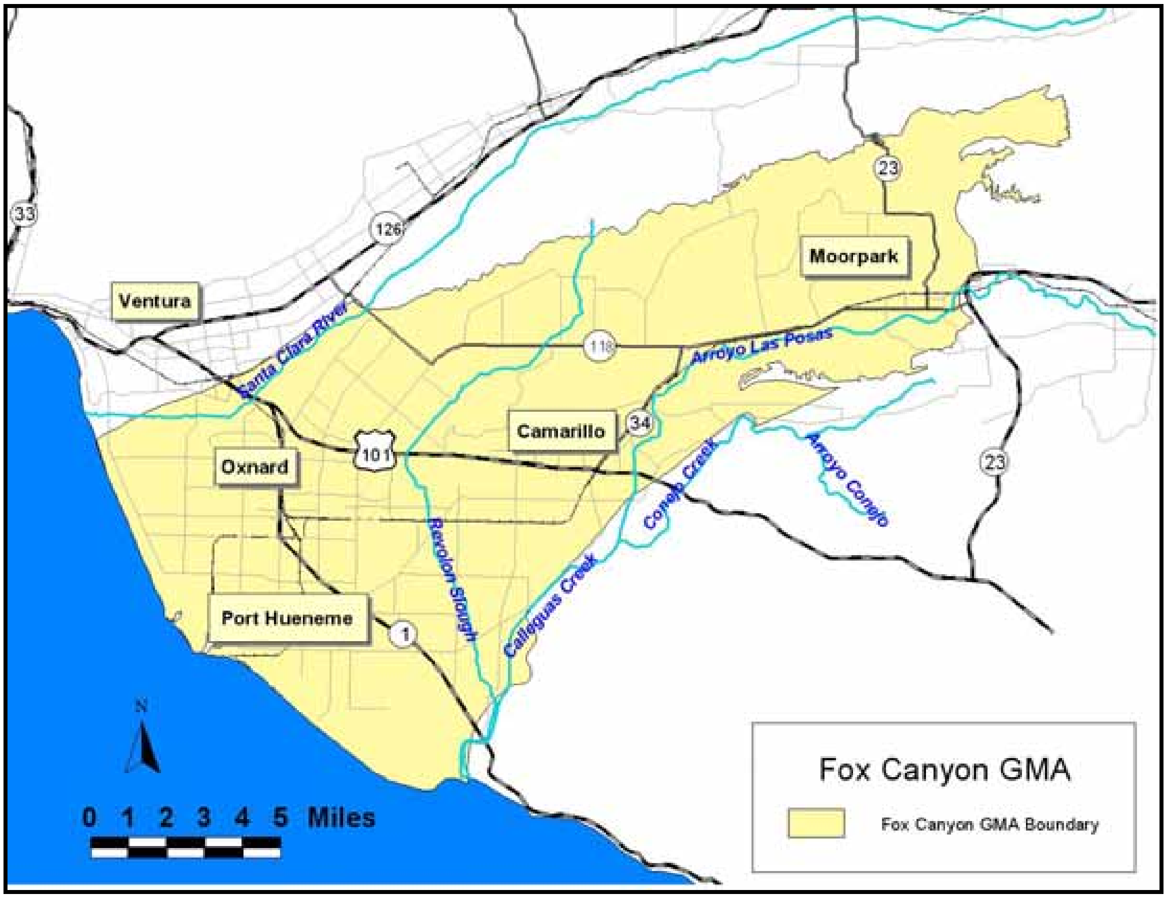


Figure 1. Location map of Fox Canyon Groundwater Management Agency boundary.

The Annotated California Codes Water Appendix, Chapter 121-102 et seq. required the FCGMA to develop, adopt, and implement a plan to control groundwater extractions from the Upper Aquifer System (UAS) to achieve a balanced water supply and demand in the Upper Aquifer System by the year 2000. Additionally, the Water Code required the FCGMA to adopt a Lower Aquifer System (LAS) Management Plan for future extractions from the Lower Aquifer System, including a policy for issuing well permits and a Contingency Plan for seawater intrusion into the Lower Aquifer System. The FCGMA adopted its original Groundwater Management Plan in 1985. The original FCGMA Groundwater Management Plan specified several major items or tasks for accomplishment.

CALLEGUAS WHOLESALE DISTRICT

SUPPLIER	WATER COMPANY
Calleguas (CAL-001)	ACADEMY MWC
Calleguas (CAL-002)	ARROYO LAS POSAS MWC
Calleguas (CAL-003)	BALCOLM BIXBY MWA
Calleguas (CAL-004)	BERYLWOOD HEIGHTS MWC
Calleguas (CAL-005)	BRANDEIS-BARDIN MWC
Calleguas (CAL-006)	CONEJO TRAILER PARK
Calleguas (CAL-007)	CALIFORNIA WATER SERVICE COMPANY
Calleguas (CAL-008)	CALIFORNIA AMERICAN WATER COMPANY
Calleguas (CAL-009)	CALLEGUAS MWD
Calleguas (CAL-011)	CAMROSA WATER DISTRICT
Calleguas (CAL-012)	CITY OF CAMARILLO
Calleguas (CAL-013)	CITY OF OXNARD
Calleguas (CAL-014)	CITY OF THOUSAND OAKS
Calleguas (CAL-015)	CRESTVIEW MWC
Calleguas (CAL-016)	DEL NORTE MWC
Calleguas (CAL-017)	EPWORTH MWC
Calleguas (CAL-019)	FOXFIELD RIDING CLUB
Calleguas (CAL-020)	FULLER FALLS MWC
Calleguas (CAL-022)	SUNSHINE RANCH
Calleguas (CAL-023)	LA LOMA RANCH MWC
Calleguas (CAL-024)	LAKE SHERWOOD CSD
Calleguas (CAL-025)	LAS LOMAS WATER SYSTEM
Calleguas (CAL-026)	MESA WATER COMPANY
Calleguas (CAL-027)	OAK PARK WATER SERVICE
Calleguas (CAL-028)	OXNARD UNION HIGH SCHOOL DISTRICT
Calleguas (CAL-029)	PLEASANT VALLEY MWC
Calleguas (CAL-030)	RANCHO CANADA WATER COMPANY
Calleguas (CAL-031)	TOM GRETHER FARMS, Inc.
Calleguas (CAL-035)	GOLDEN STATE WATER CO - Simi Valley
Calleguas (CAL-036)	THERMIC MWC
Calleguas (CAL-038)	VENTURA COUNTY WATERWORKS DISTRICT NO. 1
Calleguas (CAL-039)	VENTURA COUNTY WATERWORKS DISTRICT NO. 8
Calleguas (CAL-040)	VENTURA COUNTY WATERWORKS DISTRICT NO.17
Calleguas (CAL-041)	VENTURA COUNTY WATERWORKS DISTRICT NO.19
Calleguas (CAL-042)	WATERS ROAD USERS GROUP
Calleguas (CAL-044)	ZONE MWC
Calleguas (CAL-179)	BUTLER RANCH MWC
Calleguas (CAL-190)	BALCOM CANYON WATER WELL
Calleguas (CAL-195)	EL CAMPEON RANCH
Calleguas(CAL-196)	COMMANCIA RANCH

CASITAS WHOLESALE DISTRICT

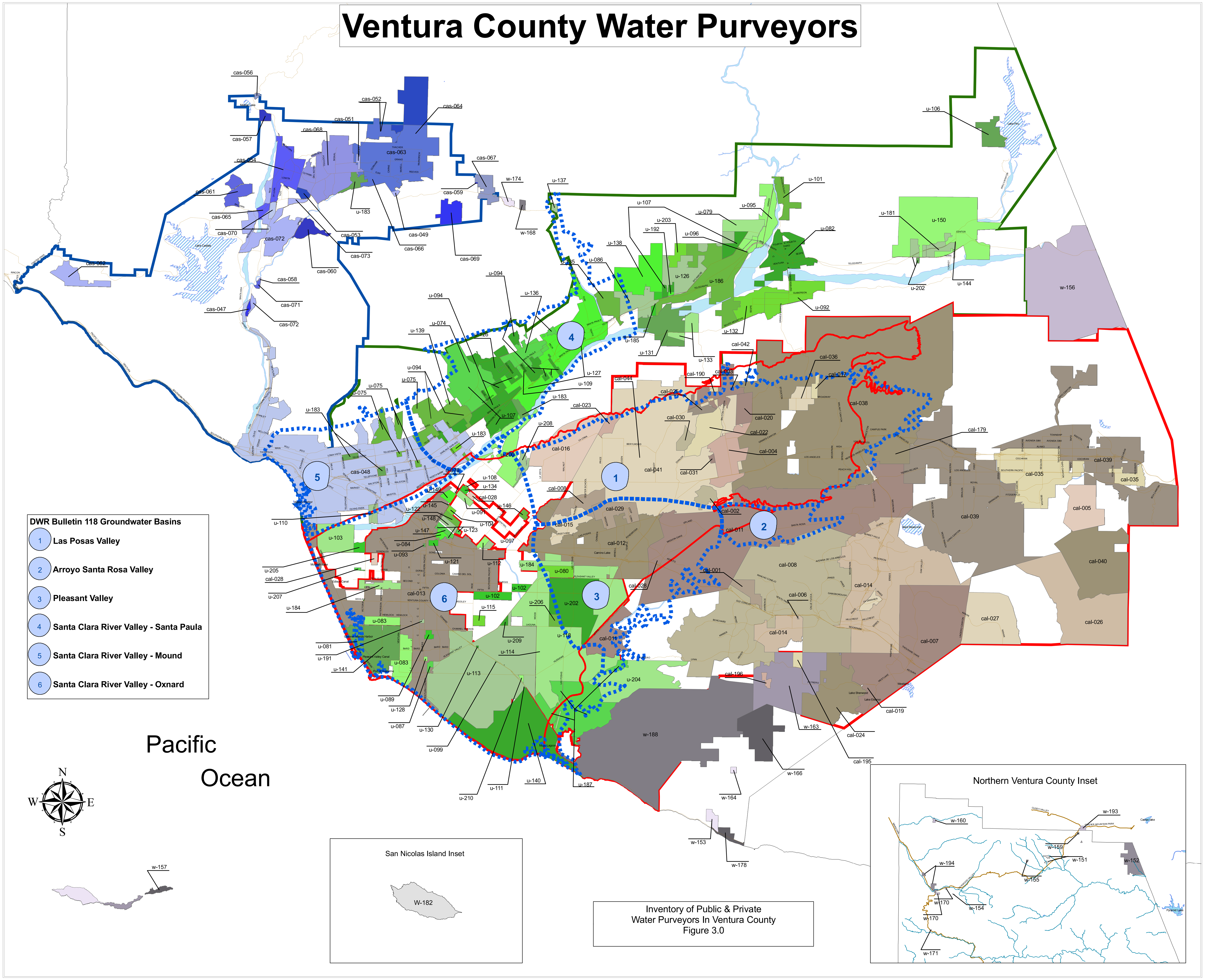
SUPPLIER	WATER COMPANY
Casitas (CAS-046)	CASITAS MWD
Casitas (CAS-047)	CASITAS MWC
Casitas (CAS-048)	CITY OF SAN BUENAVENTURA
Casitas (CAS-049)	DENNISON PARK WATER SYSTEM
Casitas (CAS-051)	GRIDLEY ROAD WATER GROUP*
Casitas (CAS-052)	HERMITAGE MWC
Casitas (CAS-053)	KROTONA INSTITUTE OF THEOSOPHY
Casitas (CAS-054)	MEINERS OAKS CWD
Casitas (CAS-056)	NORTH FORK SPRINGS MWC
Casitas (CAS-057)	OJALA
Casitas (CAS-058)	OLD CREEK ROAD MWC
Casitas (CAS-059)	OVIATT WATER ASSOCIATION
Casitas (CAS-060)	RANCHO del CIELO MWC
Casitas (CAS-061)	RANCHO MATILIJA MWC
Casitas (CAS-062)	RINCON WATER AND ROADWORKS
Casitas (CAS-063)	OJAI WATER CONSERVATION DISTRICT
Casitas (CAS-064)	SENIOR CANYON MWC
Casitas (CAS-065)	SHERIFF'S HONOR FARM
Casitas (CAS-066)	SIETE ROBLES MWC
Casitas (CAS-067)	SISAR MWC
Casitas (CAS-068)	GOLDEN STATE WATER CO - Ojai
Casitas (CAS-069)	SULPHUR MOUNTAIN ROAD WATER ASSOCIATION
Casitas (CAS-070)	TICO MWC
Casitas (CAS-071)	TRES CONDADOS
Casitas (CAS-072)	VENTURA RIVER COUNTY WATER DISTRICT
Casitas (CAS-073)	VILLANOVA ROAD WATER WELL ASSOCIATION

UNITED WHOLESALE DISTRICT

SUPPLIER	WATER COMPANY
United (U-074)	ALISO MWC
United (U-075)	ALTA MWC
United (U-076)	BEEDY STREET WELL
United (U-079)	BROWNSTONE MWC
United (U-080)	CAMARILLO AIRPORT UTILITY ENTERPRISE
United (U-081)	CHANNEL ISLANDS BEACH COMMUNITY SERVICES DISTRICT
United (U-082)	CITY OF FILLMORE
United (U-083)	CITY OF PORT HUENEME
United (U-084)	CLOVERDALE MWC
United (U-086)	COMMUNITY MWC
United (U-087)	CYPRESS MWC
United (U-088)	SUNSHINE TRAILER PARK
United (U-089)	DEMPSEY ROAD MWC
United (U-091)	SEACOAST COOLING
United (U-092)	ELKINS RANCH COMPANY
United (U-093)	EVERGREEN TRAILER PARK
United (U-094)	FARMER'S IRRIGATION COMPANY
United (U-095)	FILLMORE IRRIGATION COMPANY
United (U-096)	FILLMORE WEST MOBILE HOME PARK
United (U-097)	GARDEN ACRES MWC
United (U-099)	GLENNVIEW MOBILE HOME PARK
United (U-101)	GOODENOUGH MWC
United (U-102)	HAILWOOD, INC.
United (U-103)	CB SOUTH
United (U-104)	POINSETTIA STOCK FARM
United (U-106)	LAKE PIRU RECREATION AREA
United (U-107)	LIMONEIRA ASSOCIATES
United (U-108)	LINDA VISTA JUNIOR ACADEMY
United (U-109)	MIDDLE ROAD MWC
United (U-110)	MONTALVO MWC
United (U-111)	NAVALAIR MOBILEHOME COURT
United (U-112)	NYELAND ACRES MWC
United (U-113)	OCEAN VIEW MWC
United (U-114)	OCEAN VIEW SCHOOL DISTRICT (LAGUNA VISTA SCHOOL)
United (U-115)	OXNARD LEMON MWC
United (U-118)	PLEASANT VALLEY CWD
United (U-121)	RIO MANOR MWC
United (U-122)	RIO PLAZA WATER COMPANY
United (U-123)	RIO REAL/RIO DEL VALLE SCHOOLS
United (U-126)	SAN CAYETANO MWC
United (U-127)	CITY OF SANTA PAULA
United (U-128)	SAVIERS ROAD MWC
United (U-130)	SILVER WHEEL RANCH MOBILE HOME PARK
United (U-131)	SOUTH MOUNTAIN MWC
United (U-132)	SOUTHSIDE IMPROVEMENT CO
United (U-133)	STORKE MWC
United (U-134)	STRICKLAND MWC
United (U-135)	TEAGUE-McKEVETT CO- LIMONEIRA
United (U-136)	THERMAL BELT MWC
United (U-137)	THOMAS AQUINAS COLLEGE
United (U-138)	TIMBER CANYON MWC
United (U-139)	TOBOCK RANCH MWC
United (U-140)	U.S.N.A.S. - Point Mugu
United (U-141)	U.S.N.C.B.C.- Port Hueneme
United (U-142)	UNITED WCD
United (U-144)	VENTURA COUNTY WATERWORKS DISTRICT NO.16
United (U-145)	G.P. RESOURCES
United (U-146)	VENTURA SCHOOL
United (U-147)	VINEYARD AVENUE ACRES MWC
United (U-148)	THE MUTUAL WATER COMPANY OF VINEYARD AVENUE ESTATES
United (U-149)	VINEYARD MWC
United (U-150)	WARRING WATER SERVICE
United (U-181)	PIRU MWC
United (U-183)	VENTURA COUNTY PROPERTY ADMINISTRATOR
United (U-184)	VENTURA COUNTY DEPT. of AIRPORTS
United (U-185)	HARDSCRABBLE MWC
United (U-186)	SESPE AGRICULTURAL WATER
United (U-187)	GUADALASCA MWC
United (U-191)	SANTA CLARA HIGH SCHOOL
United (U-192)	CITRUS MWC
United (U-200)	LLOYD-BUTLER MWC
United (U-201)	OXNARD MWC
United (U-202)	RANCHO SESPE WORKERS IMPROVEMENT ASSOCIATION
United (U-203)	TOLAND ROAD WATER SYSTEM
United (U-204)	THORNHILL MWC
United (U-205)	SANTA CLARA RESOURCES
United (U-206)	HOUWELING'S NURSERY
United (U-207)	PYRAMID FLOWERS
United (U-208)	SATICOY COUNTRY CLUB
United (U-209)	VUJOVICH RANCH
United (U-210)	BOUQUET MULTIMEDIA

SUPPLIERS WITHOUT WHOLESALE DISTRICT

SUPPLIER	WATER COMPANY
None (W-152)	ANTELOPE VALLEY - EAST KERN WATER AGENCY
None (W-153)	WILSHIRE BLVD. TEMPLE CAMPS & CONFERENCE CENTER
None (W-154)	CAMP SCHEIDECK LODGE
None (W-155)	CAMP THREE FALLS - BSA
None (W-156)	CASTAIC LAKE WATER AGENCY
None (W-157)	CHANNEL ISLANDS NATIONAL MONUMENT
None (W-158)	CHUCHUPATE CAMPGROUND
None (W-159)	CHUCHUPATE RANGER STATION
None (W-160)	COMPTON HUNTING and FISHING CLUB
None (W-163)	HIDDEN VALLEY MWD
None (W-164)	LAZY J. RANCH
None (W-166)	CIRCLE X RANCH
None (W-168)	NEW CAMP BARTLETT
None (W-170)	OZENA RANGER STATION
None (W-171)	PINE MOUNTAIN INN
None (W-174)	SWEETWATER SPRING RANCH
None (W-178)	YERBA BUENA WATER COMPANY
None (W-182)	U.S. NAVY - San Nicolas Island
None (W-188)	POINT MUGU STATE PARK
None (W-193)	LAKE OF THE WOODS MWC
None (W-194)	OZENA VALLEY SPORTSMANS CLUB



Ventura County Watershed Protection District

Water & Environmental Resources Division
Groundwater Section
800 South Victoria Ave.
Ventura, CA 93009-1600
Ph: (805) 654-2088
Fx: (805) 677-8762

Created: Feb 2006
By: JPD

Legend

DWR Bull. 118 GW Basins | Roads | Casitas MWD | Water Bodies | County Boundary
FoxCynGMA-bdy | Calleguas MWD | UWCD

1:87,500

1 inch equals 3 miles

0 1.5 3 6 Miles

DISCLAIMER: The information contained herein was created by the Ventura County Watershed Protection District solely for its own use. The VCWPD assumes no liability for damages incurred directly or indirectly as a result of errors, omissions or discrepancies.

Plate 1

At the time of the initial Management Plan development in 1984-1985, the primary threat to the aquifers of western Ventura County was seawater intrusion in the Upper Aquifer System. Since that time, a number of studies have identified other water quality problems, including saline intrusion in the Lower Aquifer System (LAS) in the Pleasant Valley basin, and in the Las Posas basin. This update to the groundwater management plan is designed to look at a broader range of problems and to suggest potential solutions to these problems.

Since 1985, there have been a number of studies conducted within the FCGMA, the most comprehensive being the Regional Aquifer System Analysis (or RASA Study) done by the U.S. Geological Survey (USGS) in the late 1980s and 1990s. This study, conducted with the cooperation of local agencies, consisted of drilling monitoring wells with individual casings perforated in selected aquifers or water-bearing zones, constructing a groundwater model, and conducting hydrogeologic studies. Monitoring wells, most constructed along the coastline of the Oxnard Plain, continued to provide critical information on the status of saline intrusion. In addition, a number of more specific or follow-up studies have been conducted by the United Water Conservation District (UWCD) and other agencies. These studies have helped characterized seawater intrusion along the coastline, saline contamination in more inland areas, and nitrate contamination in the Upper Aquifer System. The USGS MODFLOW groundwater model has been used and refined by the groundwater staff at UWCD to test a variety of projects that could help mitigate the water quality problems within the FCGMA.

This 2007 Update to the FCGMA Groundwater Management Plan incorporates all previous work and the specific studies that were undertaken as part of this most-recent planning process. The Plan is organized with the results of past and current studies followed by an evaluation of both current management strategies and potential future management strategies for the FCGMA. Various groundwater management ideas and strategies have been evaluated first by FCGMA staff, and UWCD staff, and then reviewed by Calleguas Municipal Water District (CMWD) management and staff and consultants from the water purveyors within the FCGMA. Extensive public review by stakeholders was also a critical part of the planning process.

Appendix C includes a document entitled, the East Los Posas Basin Management Plan (ELPBMP). The ELPBMP was developed through ongoing discussions between CMWD and the Las Posas Basin Users Group (farm well owners, mutual water companies, and the Ventura County Water Works Districts that supply water to the City of Moorpark and others). The ELPBMP serves as a more detailed sub-basin management planning document grounded in the FCGMA February 23, 1994 approval of CMWD's Application for Injection/Storage Facilities in the North Los Posas Groundwater Basin. (Appendix C - Exhibit A). As such, the ELPBMP particularly addresses the interaction of CMWD's Aquifer Storage and Recovery (ASR) project with other basin pumpers regarding both basin-wide and local effects of the project.

2.0 BACKGROUND OF GROUNDWATER MANAGEMENT AND OVERDRAFT WITHIN THE FCGMA

Although high chloride levels were first documented near Port Hueneme in the 1930s (California Department of Water Resources [DWR], 1954), the conditions for widespread seawater intrusion on the Oxnard Plain were initiated as early as the 1940s, when groundwater levels beneath the southern portion of the Oxnard Plain basin dropped below sea level (see Appendix A). Within 5 to 10 years, chloride concentrations in wells in the Port Hueneme area started to increase rapidly. At that time, seawater had only affected a few wells in the Port Hueneme area, encompassing an area less than one square mile (Appendix A).

Within 20 years, seawater intrusion in the Port Hueneme area had extended as much as 3 miles inland. In some of the affected wells, chloride concentrations were as high as those of seawater (just less than 20,000 mg/L). Appendix A documents the progression of seawater intrusion beneath the southern portion of the Oxnard Plain basin. This seawater intrusion into the Upper Aquifer System was located adjacent to the Hueneme Submarine Canyon that is directly offshore of Port Hueneme (Figure 2). Seawater intrusion also occurred in the Point Mugu area, adjacent to the Mugu Submarine Canyon that extends offshore from Mugu Lagoon. This intrusion in the Point Mugu area first impacted Upper Aquifer System wells in late 1950s (Appendix A).

In the Port Hueneme area, seawater in the Upper Aquifer System reached its farthest point inland in the early 1980s (Appendix A). Following the high rainfall year of 1983, chloride levels began to decrease in many of the Port Hueneme area wells perforated in the UAS. Coupled with pumping allocations and management strategies imposed by the FCGMA, this improving trend in chloride reductions was accelerated in the 1990s, as the Freeman Diversion was completed by UWCD and several wet years occurred, which allowed increased recharge available from the diversion, helping restore aquifer pressures and pushing seawater back toward the coast.

Groundwater levels in the Lower Aquifer System also dropped below sea level in the late 1950s. This Lower Aquifer System intrusion was first detected in wells in the late 1980s (Appendix A). As with the Upper Aquifer System, the intrusion in the Lower Aquifer System spread into the aquifer both near Port Hueneme and at Point Mugu. Further exacerbating the drops in groundwater levels in the LAS was an increase in production in the Lower System – partly in search of better quality water supplies and partly because new or replacement wells were required to be drilled in the LAS as a strategy to lessen pumping in the intruded Upper Aquifer System.

The overpumping of the aquifers that led to seawater intrusion also created land subsidence of up to 2.2 feet in the Pleasant Valley area north and northwest of Mugu Lagoon by the early 1970s as dewatered clay layers between aquifer zones collapsed from reduced hydrostatic pressures. This subsidence is permanent – refilling of the sand and gravel aquifers cannot force water back into the dewatered clay layers.

In the Point Mugu area (Figure 2), chlorides have not lessened over the past two decades. Instead, chloride concentrations continued to increase in the area of Mugu Lagoon, reaching concentrations almost as high as seawater in some wells. The CM1A monitoring well in that area showed an increase in chloride concentrations from several hundred mg/L to 4,600 mg/L in a little more than one decade.

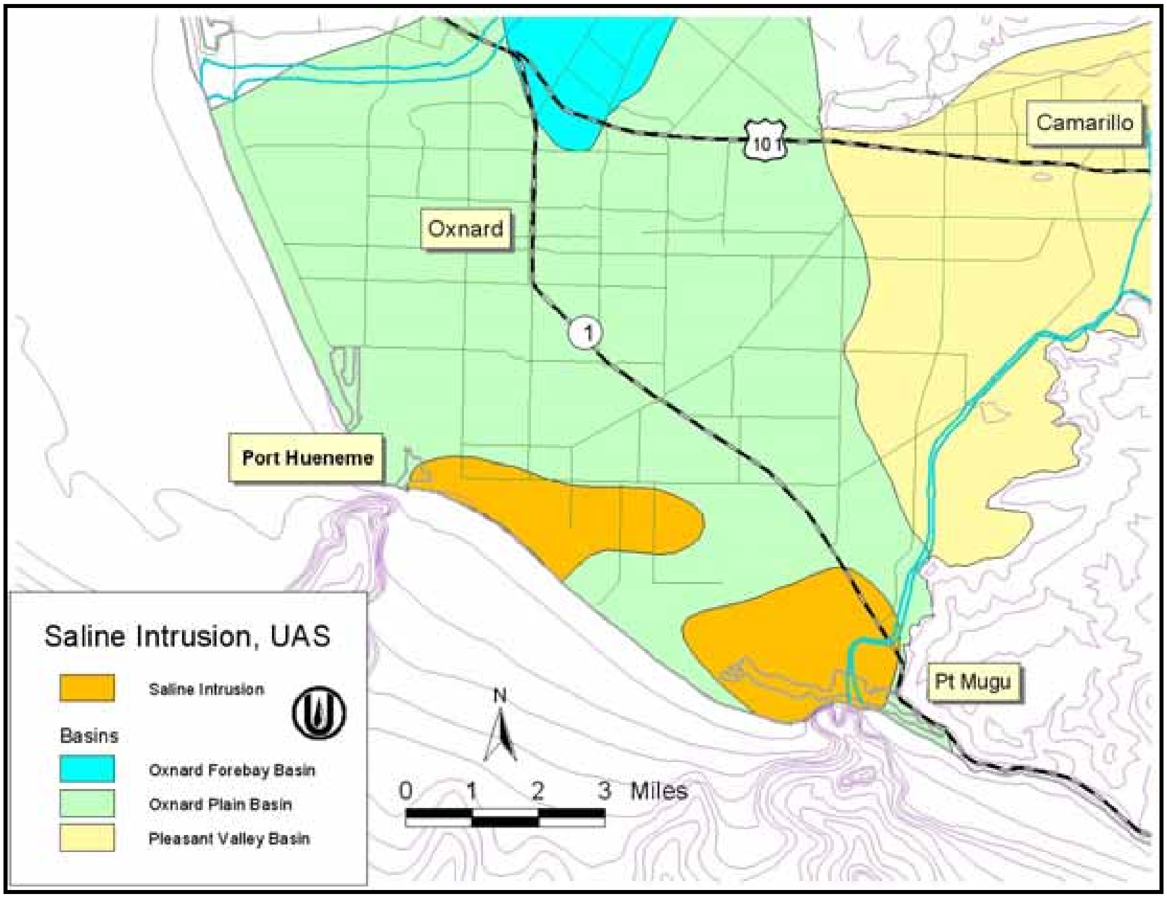


Figure 2. Areas of saline intrusion beneath the Oxnard Plain basin in 2006. The sources of the saline intrusion are discussed in section 5.1.1 *Seawater Intrusion*.

As the USGS began their work in Ventura County in late 1980s, they proposed that the increase in chlorides in the UAS and LAS was caused not just from seawater intrusion but also from the intrusion of saline waters being pulled from surrounding sediments and from deeper depths along fault zones (Izbicki, 1991, 1992; discussed in more detail in section 5.1.1 *Seawater Intrusion*). The cause of this additional saline contamination was the same as for seawater intrusion, that is, very low groundwater levels. This additional saline contamination of groundwater inland from the lobes of seawater intrusion was caused by excessive groundwater pumping and lowered groundwater levels. This finding raised the possibility that saline contamination could occur in inland areas wherever groundwater levels are particularly depressed.

There was some initial concern chloride concentrations measured in some of the producing wells were simply detecting high chloride waters flowing downward from failed well casings. To ensure monitoring results were accurately depicting saline intrusion, a series of monitoring wells were drilled along the coastal portions of the Oxnard Plain. These multiple-completion wells consist of a single well bore containing several smaller-diameter PVC wells completed at varying aquifer depths. These monitoring wells give discrete depth-dependent data from the aquifers and form the basis of much of the current monitoring program.

Several trends in saline intrusion are evident on the south Oxnard Plain. The Port Hueneme lobe of seawater intrusion has decreased considerably in size and chloride concentration in the

Upper Aquifer System. However, Lower Aquifer System chloride concentrations have somewhat increased in this Port Hueneme lobe. In the more southeastern Point Mugu lobe, concentrations of chloride are generally higher than in the past both in the UAS and LAS; the areal extent of the intrusion of seawater is not known with precision. The area affected by saline intrusion from surrounding sediments has increased both in size and in chloride concentration. This increase in size has prompted United Water Conservation District to drill new monitoring wells inboard of this saline intrusion to detect further movement of salts.

Local and State Actions – The increasing seawater intrusion prompted the State Water Resources Control Board to consider adjudication in the early 1980s, with the result that local agencies, working with the State Board, created a series of physical solutions and institutions to tackle the problem. The physical solutions included adding artificial recharge capability for the aquifers and providing additional in-lieu surface water to groundwater pumpers. The institutional solution was the formation of the Fox Canyon Groundwater Management Agency to bring water usage into balance with recharge sources to prevent overdraft conditions.

Formation of the Fox Canyon Groundwater Management Agency – In 1982, State Senate Bill 2995 was approved creating the Fox Canyon Groundwater Management Agency (FCGMA). The agency's activities were defined as "planning, managing, controlling, preserving, and regulating the extraction and use of groundwater within the territory of the agency." That directive also went on to say, "shall not involve itself in activities normally and historically undertaken by its member agencies, such as the construction and operation of dams, spreading grounds, pipelines, flood control facilities, and water distribution facilities, or the wholesale and retail sale of water." This prohibition of water conservation and distribution facilities along with water sales by the FCGMA was clearly meant to delineate the separate powers of the various agencies within the County (see following section).

The FCGMA officially began operations on January 1, 1983 with the County of Ventura contracting to provide staffing and related services to the new agency. In May 1983, Ordinance No. 1 was adopted requiring all wells within the agency to register and begin reporting groundwater extractions. This ordinance also set extraction management fees (at $0.50/AF), becoming the sole source of income to the fledgling agency sans any minor penalty or surcharge fees that would be instituted in later ordinance revisions. Ordinance No. 2 (October 1983) was a short amendment to Ordinance No. 1 establishing semi-annual groundwater extraction reporting to cover the first and second half of each calendar year, with statements due within 30 days following each period.

A groundwater management plan was adopted in 1985 to set goals and to help guide FCGMA policies. In February 1987, Ordinance No. 3 was adopted to require flow meters on all but domestic wells. Ordinance No. 4 (July 1987) soon followed that protected the aquifer outcrop areas in the East and West Las Posas basin (formerly collectively referred to as the North Las Posas basin) and regulated groundwater extractions in the basin via more detailed rules than those in any previous ordinance. The adoption of Ordinance No. 5 in August 1990 completed the first steps for the FCGMA by setting up a system of scheduled extraction reductions, allowing for the use of Historical, Baseline, and Agricultural Efficiency Allocations, and establishing a credit system to encourage cutbacks in pumping, along with a penalty system for overpumping beyond the established annual allocation.

Agencies' responsibilities - Several agencies are responsible for managing water resources in Ventura County. The FCGMA has responsibility for groundwater management planning, managing pumping allocations and credits, and developing policies related to groundwater extractions and recharge. United Water Conservation District (UWCD) has responsibility for managing groundwater resources in seven basins in the county, including most of the basins within the Fox Canyon Groundwater Management Agency (FCGMA) (Plate 1). UWCD's responsibilities include groundwater and surface water monitoring, constructing and maintaining water conservation and recharge facilities, reporting on groundwater conditions, and groundwater management and planning activities. Groundwater management and planning functions overlap between the FCGMA, UWCD, and other local agencies, with the FCGMA focusing on extractions and policy and UWCD focusing on planning and implementing projects. Calleguas Municipal Water District (CMWD) is responsible for providing State Water to portions of Ventura County and providing water management strategies to ensure a reliable source of water for its customers (Plate 1). The Ventura County Watershed Protection District (VCWPD) is responsible for flood control functions, groundwater/surface water monitoring, and water well permitting. The water purveyors (cities and water districts) decide how much and from where their groundwater supplies are extracted, as well as plan projects that benefit the aquifers. There has been a remarkable amount of cooperation among these organizations in addressing groundwater issues over the last 20+ years.

In practice, groundwater management functions within the boundaries of the FCGMA are performed in the following ways:

1. Groundwater levels and groundwater quality sampling and analysis are conducted by UWCD, VCWPD, and individual water purveyors;
2. Groundwater extraction records are collected by both the FCGMA and UWCD, with the FCGMA maintaining records on extraction allocations and credits;
3. An annual report on groundwater conditions is prepared by UWCD within UWCD boundaries and CMWD prepares reports on groundwater conditions within the West, East, and South Las Posas basins (in conjunction with the Las Posas Basin Users Group;
4. Water purveyors prepare regular plans on current and future water use and supplies (e.g., Urban Water Management Plans);
5. The FCGMA prepares this Groundwater Management Plan to evaluate basin management objectives, strategies, and policies;
6. UWCD and some of the water purveyors construct and operate water conservation facilities; and
7. The VCWPD (and the City of Oxnard within its boundaries) oversees all well drilling, well destruction, and monitoring well requirements and permitting.

The initial Groundwater Management Plan (September 1985) prepared by the FCGMA recommended groundwater pumping be reduced by 25% over a 20-year period to help bring the aquifers into balance or to reach safe yield by year 2010 and to mitigate seawater intrusion by that same target date. This plan was based on groundwater demand projections for the period between 1980 and 2010. Subsequent Board ordinances (Ordinance No. 5) formulated an extraction allocation for all groundwater pumpers within the FCGMA, based on average extractions during the years 1985 to 1989. Starting in 1990, these pumping or “Historical” allocations were to be reduced by 5% every five years, with a planned 25% total reduction by the year 2010.

A program of “Conservation” and “Storage” credits allows well operators to vary their annual pumping in accordance with crop changes and/or annual hydrologic conditions. In addition, agricultural pumpers are allowed the option of using Irrigation Efficiency instead of the allocation/credit program. Agricultural efficiency for individual pumpers (later deemed as "operators" of one or more wells) is required to be at least 80% or better (20% or less going to leaching, deep percolation, or runoff), when compared to FCGMA allowed water for particular crop water demand based on daily evapotranspiration and precipitation measurements from a series of weather stations installed throughout the FCGMA. A surcharge fee, based on the extraction reporting, was formulated to penalize individual pumping above allowed annual allocations or not meeting the required irrigation efficiency percentage minimum. These penalties have been seldom used since their inception, largely because of widespread cooperation among pumpers to reduce groundwater extractions.

In cooperation with the Watershed Protection District, the FCGMA also helped formulate requirements that new wells be completed in specific aquifers to help control seawater intrusion. A similar cooperative program that utilized Federal 319(h) grant funds coupled with matching local funds helped destroy a number of abandoned wells across the Oxnard Plain which, had the potential to act as conduits allowing inter-aquifer mixing. A total of 49 old abandoned or leaking wells were destroyed under this program.

3.0 GROUNDWATER BASINS & HYDROGEOLOGY

The basins within the FCGMA are part of the Transverse Ranges geologic province, in which the mountain ranges and basins are oriented in an east-west rather than the typical northeast-southwest trend in much of California and the western United States. Active thrust faults border the basins of the Santa Clara River, causing rapid uplift of the adjacent mountains and downdropping of the basins. The alluvial basins are filled with substantial amounts of Tertiary and Quaternary sediments deposited in both marine and terrestrial (non-marine) settings. The basins beneath the Oxnard Plain are filled with sediments deposited on a wide delta complex formed at the terminus of the Santa Clara River and was heavily influenced by alternating episodes of advancing or retreating shallow seas that varied with world-wide sea level changes over many millions of years.

There are seven main or significant groundwater basins within the FCGMA (Figure 3). These groundwater basins have been called by somewhat different names historically; this Plan uses the terminology of the U.S. Geological Survey from their work in the 1990s and early 2000s (e.g., Hanson et al., 2003) because it is the most recent comprehensive study of the basins. These groundwater basins include the Oxnard Plain, the Oxnard Plain Forebay, the Pleasant Valley, the Santa Rosa, and the East, West and South Las Posas basins. These basins generally contain two major aquifer systems, the Upper Aquifer System (UAS) and the Lower Aquifer System (LAS). Separate aquifers locally named within these systems include the Oxnard and Mugu aquifers (UAS) and the Hueneme, Fox Canyon, and Grimes Canyon aquifers (LAS). A shallower, unconfined aquifer is also present locally underlying rivers and creeks. Underlying the Oxnard Plain and Pleasant Valley basins are sand layers of the "semi-perched zone," which may locally contain poor-quality water. This zone extends from the surface to no more than 100 ft in depth. These sands overlie confining clay of the upper Oxnard Aquifer which generally protects the underlying aquifers from contamination from surface land uses. The Semi-perched zone is rarely used for water supply.

The aquifers are comprised of sand and gravel deposited along the ancestral Santa Clara River, within alluvial fans along the flanks of the mountains, or in a coastal plain/delta complex at the terminus of the Santa Clara River and Calleguas Creek. The aquifers are recharged by infiltration of streamflow (primarily the Santa Clara River), artificial recharge of diverted streamflow, mountain-front recharge along the exterior boundary of the basins, direct infiltration of precipitation on the valley floors of the basins and on bedrock outcrops in adjacent mountain fronts, return flow from agricultural and household irrigation in some areas, and in varying degrees by groundwater underflow from adjacent basins.

LOWER AQUIFER SYSTEM – The Lower Aquifer System (LAS) consists of the Grimes Canyon, Fox Canyon, and Hueneme aquifers (e.g., Figure 6) from the deepest to the shallowest. The LAS is part of the Santa Barbara, San Pedro, and Saugus formations of Plio-Pleistocene age (Hanson et al, 2003). The lowest water-bearing unit of the East Las Posas and Pleasant Valley basins is commonly referred to as the Grimes Canyon aquifer (California Department of Water Resources, 1954; Turner, 1975). The Fox Canyon aquifer underlies all of the groundwater basins beneath the FCGMA, but is most significant in the East and West Las Posas, Pleasant Valley, Oxnard Plain Forebay, and Oxnard Plain basins. The Hueneme aquifer is considered to underlie most coastal areas of the southern Oxnard Plain (Hanson et al, 2003), and is an important source of water in the Oxnard Plain, Pleasant Valley, and the West Las Posas basins.

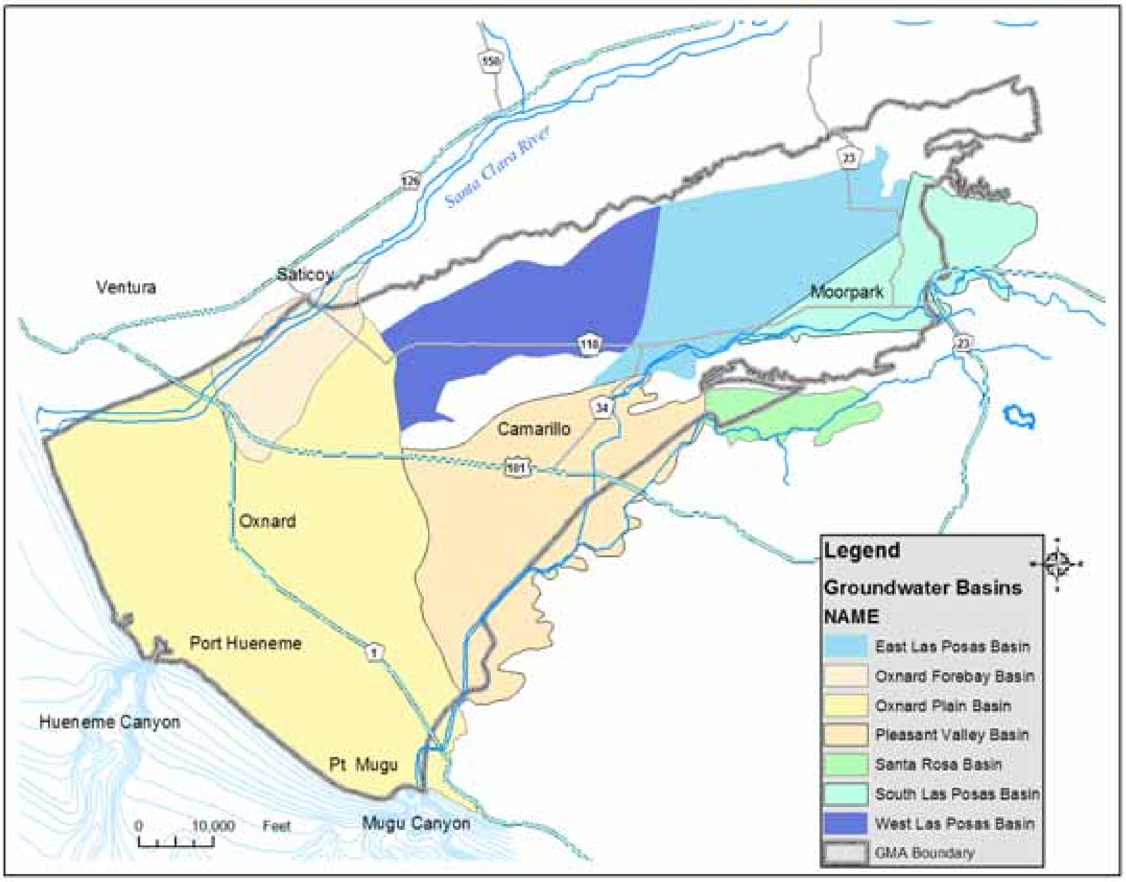


Figure 3. Groundwater basins within the Fox Canyon Groundwater Management Agency.

The aquifers within the LAS are commonly isolated from each other vertically by low-permeability units (silts and clays) and horizontally by regional fault systems. There is active tectonism (faulting and folding) within the area of the FCGMA, caused by compressional and lateral forces as the Transverse Ranges are caught in a vise between the Pacific and North American tectonic plates. As a result, the LAS is folded and tilted in many areas, and has been eroded along an unconformity separating the Upper and Lower aquifer systems.

UPPER AQUIFER SYSTEM – The Upper Aquifer System (UAS) within the FCGMA consists of the Mugu and Oxnard aquifers (Figure 5, Figure 6), from deepest to most shallow, of Late Pleistocene and Holocene age. The UAS rests unconformably on the Lower Aquifer System, with basal conglomerates in many areas (Hanson et al, 2003). In the Oxnard Plain, these coarse-grained basal deposits have been referred to as the Mugu aquifer (Turner, 1975). The Mugu aquifer is generally penetrated at a depth of 255 ft to 425 ft below land surface. The younger Oxnard aquifer is present throughout the Oxnard Plain. The Oxnard aquifer is the primary aquifer used for groundwater supply on the Oxnard Plain. This highly-permeable assemblage of sand and gravel is generally found at a depth of approximately 100 ft to 220 ft below land surface elevation.

OXNARD PLAIN FOREBAY AND OXNARD PLAIN BASINS – Both Upper and Lower aquifers are present in the Oxnard Plain Forebay and Oxnard Plain basins (Figure 4). The Oxnard Plain basin extends several miles offshore beneath the marine shelf, where outer edges of the aquifer are in direct contact with seawater. In areas near Port Hueneme and Point Mugu where submarine canyons extend nearly to the coastline (Figure 2, Figure 7), the fresh-water aquifers are in direct contact with seawater only a short distance offshore.

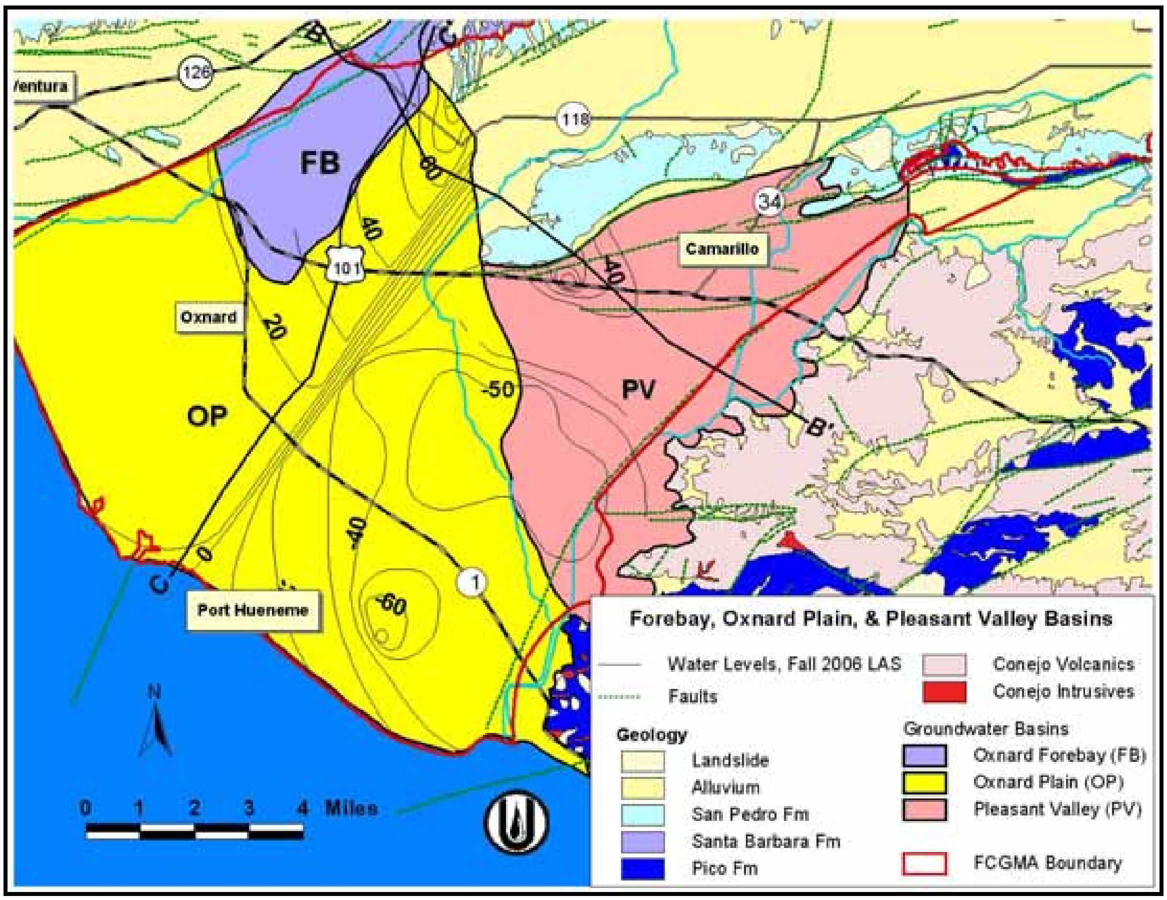


Figure 4. Map of Oxnard Forebay, Oxnard Plain, and Pleasant Valley basins. Contours of Lower Aquifer groundwater elevations in the Fall of 2006 indicate that the south Oxnard Plain and Pleasant Valley basins have significant areas below sea level. The locations of geologic sections B-B' (Figure 5) and C-C' (Figure 6) are indicated on map.

The Oxnard Plain Forebay basin is the main source of recharge to aquifers beneath the Oxnard Plain. The absence of low-permeability confining layers (no continuous clay or silt layers) between surface recharge sources and the underlying aquifers (sand and gravel layers) in the Forebay basin allows for effective recharge of the basin and subsequent recharge of aquifers further to the south and southwest (e.g., Figure 6). Recharge to the Forebay basin comes from a combination of percolation of Santa Clara River flows, artificial recharge from United's spreading grounds at Saticoy and El Rio, agricultural and household irrigation return flows, percolation of rainfall, and lesser amounts of underflow from adjacent basins. In the area of the Forebay between the El Rio and Saticoy spreading grounds, the Lower Aquifer System has been folded and uplifted and then truncated (eroded away) along its contact with the Upper Aquifer System (Figure 5, Figure 6). In this area, recharge from surface sources may enter both the Upper Aquifer System and the underlying Lower Aquifer System. It is estimated that about 20% of the water recharged to this area reaches the Lower Aquifer System, with the remainder recharging the Upper Aquifer System (Hanson, 1998).

The Oxnard Plain Forebay basin accepts large quantities of recharge water in a single year, and the basin was filled to near-capacity during several recent wet years (UWCD, 2003). High groundwater elevations in the Oxnard Plain Forebay basin increase the hydraulic head (pressure) in the confined aquifers of the Oxnard Plain, raising water levels throughout the Plain and promoting natural offshore flow in coastal areas.

The Oxnard Plain Forebay basin is hydrologically connected with the aquifers of the Oxnard Plain basin (e.g., Figure 6). Thus, the primary recharge to the Oxnard Plain basin is from underflow from the Forebay rather than the deep percolation of water from surface sources on the Plain. When groundwater levels are below sea level along the coastline, there may also be significant recharge by seawater flowing into the aquifers (from the historic discharge areas shown in Figure 7 where the aquifers are exposed on the sea floor). When Lower Aquifer System (LAS) water levels are substantially lower than Upper Aquifer System (UAS) water levels (creating a downward gradient), there may be substantial leakage of UAS water into the LAS both through discontinuities within the silts and clays between aquifers on the Oxnard Plain and as slow vertical percolation directly through the silt and clay material itself. Some amount of downward percolation can also occur via wells that are perforated in both aquifer systems and via compromised (failed or leaking) well casings.

One of the more recent findings associated with groundwater beneath the Oxnard Plain basin is a zone with a steeply-dipping groundwater gradient in the Lower Aquifer System that extends across the Oxnard Plain from just south of Port Hueneme northeastward to the south flank of the Camarillo Hills (Figure 4, just south of section C-C'). This steep gradient is apparently caused by a lower-conductance zone that bisects the Oxnard Plain at the depth of the Lower Aquifer System (e.g., UWCD, 2003). This zone, likely a fault or other structural feature, reduces recharge flowing from the Oxnard Plain Forebay basin to the south Oxnard Plain and Pleasant Valley. This zone may be an extension of the Simi-Santa Rosa fault that extends along the southern flank of the Camarillo Hills. The presence of this subsurface feature that reduces groundwater flow also limits the effectiveness of management strategies that rely on groundwater flowing in the LAS from recharge areas in the Oxnard Plain Forebay basin to the south Oxnard Plain and to Pleasant Valley. This Management Plan proposes specific strategies to overcome this geologic hurdle to recharging the LAS in these southern areas of the FCGMA.

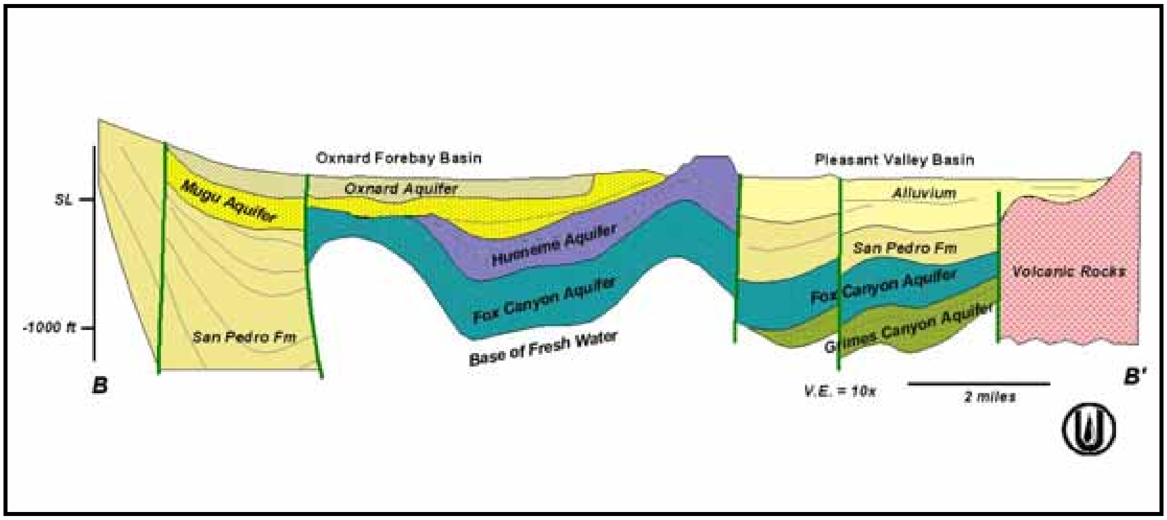


Figure 5. Geologic section B-B'. Simplified from Mukae and Turner (1975). Note ten times vertical exaggeration to accentuate stratigraphic units.

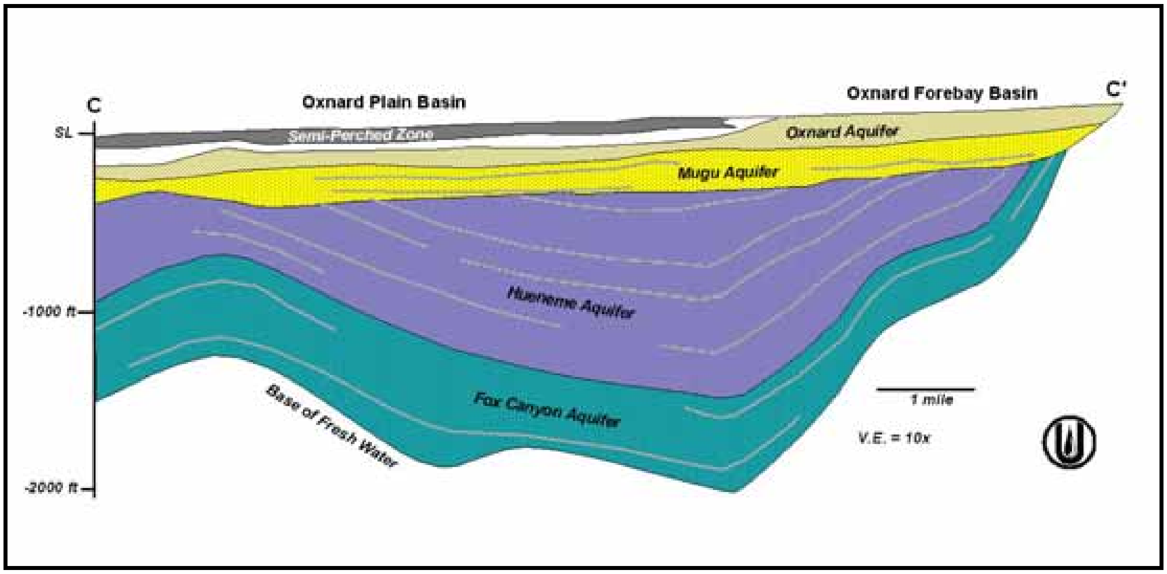


Figure 6. Geologic section C-C'. Simplified from Mukae and Turner (1975). Note ten times vertical exaggeration to accentuate stratigraphic units.

PLEASANT VALLEY BASIN – The Pleasant Valley groundwater basin (Figure 4) has been historically differentiated from the Oxnard Plain basin by a general lack of Upper Aquifer System aquifers (Turner, 1975). However, there may be local water-producing Upper Aquifer System units within the Pleasant Valley basin (Turner, 1975; Hanson et al, 2003). The Pleasant Valley basin is confined by thick fine-grained deposits overlying the aquifers of the basin. The Fox Canyon aquifer is the major water-bearing unit in the basin. Despite the fault barrier to the west, the Lower Aquifer System is in hydrologic continuity with the adjacent southern portion of the Oxnard Plain basin.

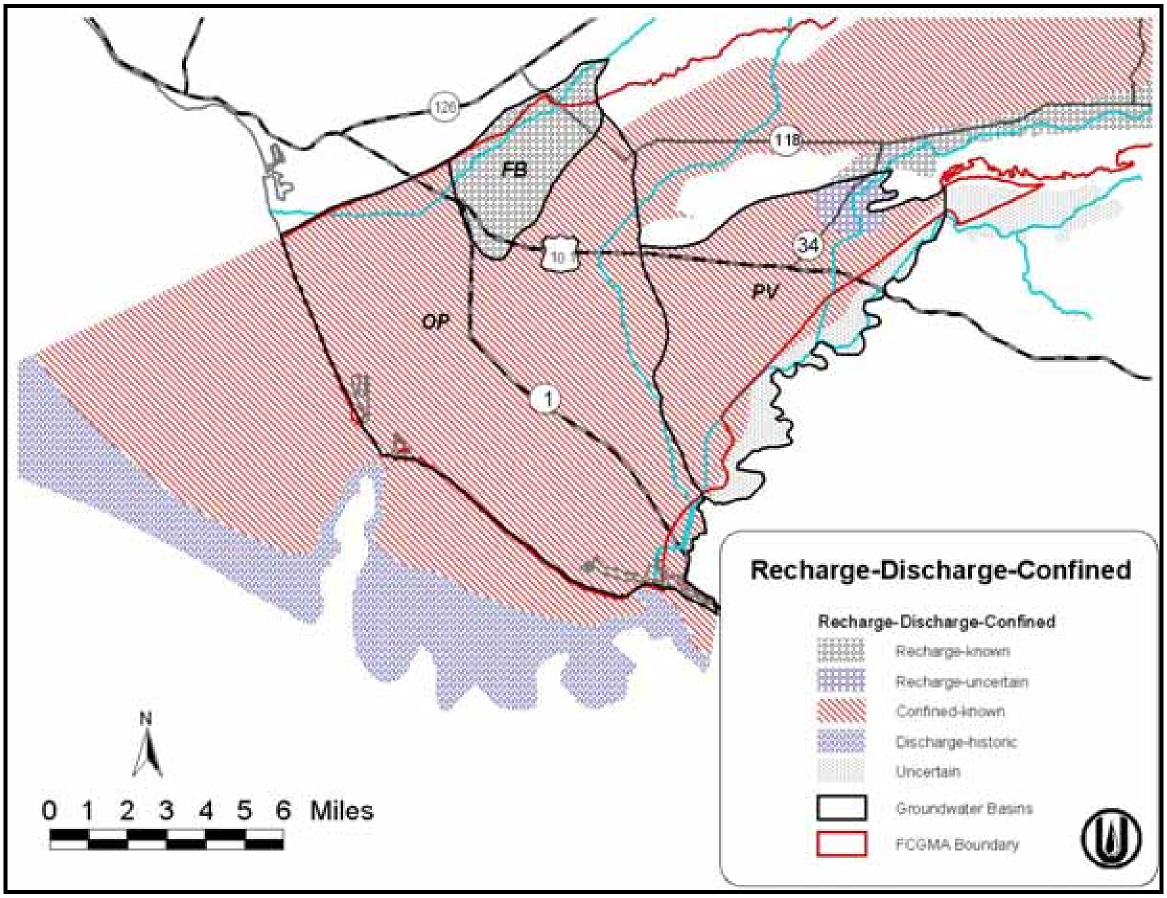


Figure 7. Recharge and discharge areas of coastal aquifers, with confined portions of the aquifers indicated. The offshore discharge area is the location where the aquifers are exposed on the ocean bottom and in submarine canyons. See text for discussion. Basin designations: OP-Oxnard Plain, FB-Oxnard Forebay, PV-Pleasant Valley.

Historically it was assumed that the LAS of the Pleasant Valley Basin was relatively confined and received little overall recharge across the fault that extends from the Camarillo Hills to Port Hueneme. However, since the early 1990s, water levels have begun to rise in the northern adjacent basins. The City of Camarillo has two existing wells in the northeast portion of the Pleasant Valley Basin (hereafter called the Somis Area) and these wells confirm that rising water levels in northern adjacent basins directly impact recharge rates, water quality, and water levels in the Somis Area. The recharge in the Somis Area may be a result of uplift and folding of Lower Aquifer units that allow rapid stream flow percolation. This area is indicated as "Recharge-uncertain" at the north end of the Pleasant Valley basin on Figure 7 to reflect the uncertainty of the extent of this area of recharge. It is recommended that additional monitoring and studies be conducted to determine the dimensions and nature of this apparent recharge area.

The groundwater hydrology of the portion of the Pleasant Valley basin east of the city of Camarillo is not well understood because there are not many wells drilled in the area. Along Calleguas Creek near California State University Channel Islands, water has been produced historically from aquifer depths that are shallower than the typical LAS well, suggesting that water-bearing strata are not limited to the LAS in this area.

It is clear that the eastern and northeastern portions of the Pleasant Valley basin need to be better understood (indicated as “Unknown” along the eastern edge of the Pleasant Valley basin on Figure 7). Past studies have considered the basin as largely confined, with perhaps some perched water along a portion of its eastern edge. The conceptual hydrogeology that was the basis for the Ventura Regional Groundwater Model used the conclusions from these studies. As suggested above, additional monitoring and studies are needed to better determine the hydrogeology of the area, with these results integrated into the groundwater model.

SANTA ROSA BASIN – The Santa Rosa basin (Figure 8) is the smallest basin within the FCGMA. Groundwater levels are heavily influenced by flows in the overlying Conejo Creek; discharges from a wastewater treatment plant and dewatering wells in Thousand Oaks have considerably increased year-round flows in the creek. Aquifers in the basin include a shallow alluvium aquifer and portions of the Lower Aquifer System. The structure of this basin is dominated by the east-trending Santa Rosa syncline that folds the San Pedro and Santa Barbara Formations (CSWRB, 1956). This syncline helps direct groundwater flow in the San Pedro Formation. The Santa Rosa fault zone forms a barrier to groundwater flow into the basin from the north. A sharp change in water level in the western part of the basin may be caused by a roughly north-trending fault that restricts groundwater flow (CDWR, 2003). Elevated nitrate and sulfate have been a problem in the basin.

LAS POSAS BASIN –The Las Posas groundwater basin (Figure 8) is bounded on the south by the Camarillo and Las Posas Hills and on the north by South Mountain and Oak Ridge (CSWRB, 1954). The basin has been variously subdivided into North and South basins (e.g., Turner and Mukae, 1975) or by West, East, and South basins (e.g., Hanson, 1998). The U.S. Geological Survey terminology (Hanson, 1998) is used in this Management Plan. Productive aquifers in this basin include a shallow unconfined aquifer that is most transmissive along the Arroyo Las Posas and a lower confined aquifer system that is considered to be the equivalent of the Lower Aquifer System on the Oxnard Plain (Figure 9).

South Las Posas Basin – This basin is separated from the East Las Posas basin by an east-trending anticline (fold) that affects all but the shallowest alluvium (Figure 9). This fold may affect groundwater flow between the East and South Las Posas basins at some aquifer depths, although recharge from the South Las Posas basin flows readily into the East Las Posas basin at Lower Aquifer System (LAS) depths. To the south, the Springville and Santa Rosa fault zones produce disrupted and tightly folded rocks along the edge of the basin, restricting groundwater flow to the south (CSWRB, 1956). There is a shallow alluvial aquifer that follows the trend of Arroyo Las Posas as it crosses the South Las Posas basin; this shallow aquifer is in hydrologic connection with the underlying LAS and is the main source of recharge to the LAS (indicated as the recharge area along the south edge of the East and South Las Posas basins on Figure 10).

There has been a significant change in average groundwater levels over the past 40 years in the South Las Posas basin, with groundwater levels rising more than 100 ft during this period. The mechanism for this rise in groundwater elevations is the increased recharge from percolation beneath the Arroyo Las Posas as discharges from the Moorpark and Simi Valley wastewater treatment plants and dewatering wells in Simi Valley have increase year-round flow in the arroyo. The entire alluvial aquifer near the arroyo has progressively filled to the elevation of the arroyo, starting in the easternmost portion of the basin in the 1960s and moving westward through the 1990s (Bachman, 2002). Water from the filled alluvial aquifer has percolated downward into the underlying Lower Aquifer System, creating a recharge mound in the Lower

Aquifer System that extends from the arroyo northward into the East Las Posas basin (CH2MHill, 1993; Bachman, 1999).

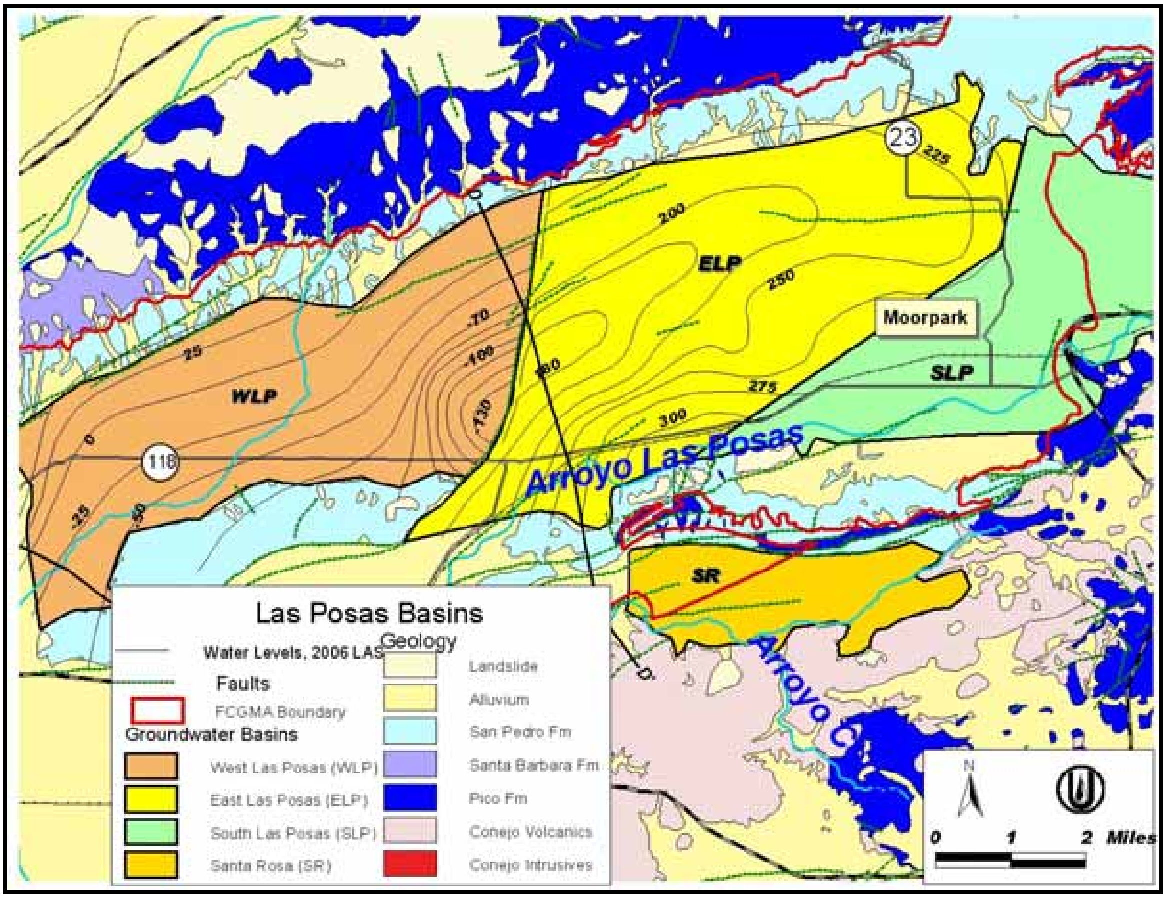


Figure 8. Map of Las Posas and Santa Rosa basins. Contours of Lower Aquifer groundwater elevations in 2006 indicate the recharge mound along Arroyo Las Posas and the change in groundwater elevations across the fault that forms the boundary between the West and East Las Posas basins. The location of geologic section D-D' (Figure 9) is indicated on the map.

Salts (i.e., chloride, sulfate) in the groundwater have increased in the South Las Posas basin and the southwestern portion of the East Las Posas basin as the shallow aquifer filled along Arroyo Las Posas. These salts apparently were leached from the shallow aquifer as groundwater levels reached record highs, saturating sediments that have been unsaturated for the historic period. These salts apparently migrated vertically with percolating groundwater into the LAS and then laterally into the main portion of the East Las Posas basin as the recharge mound developed. Some of this groundwater is unsuitable for irrigation without being blended with better-quality water.

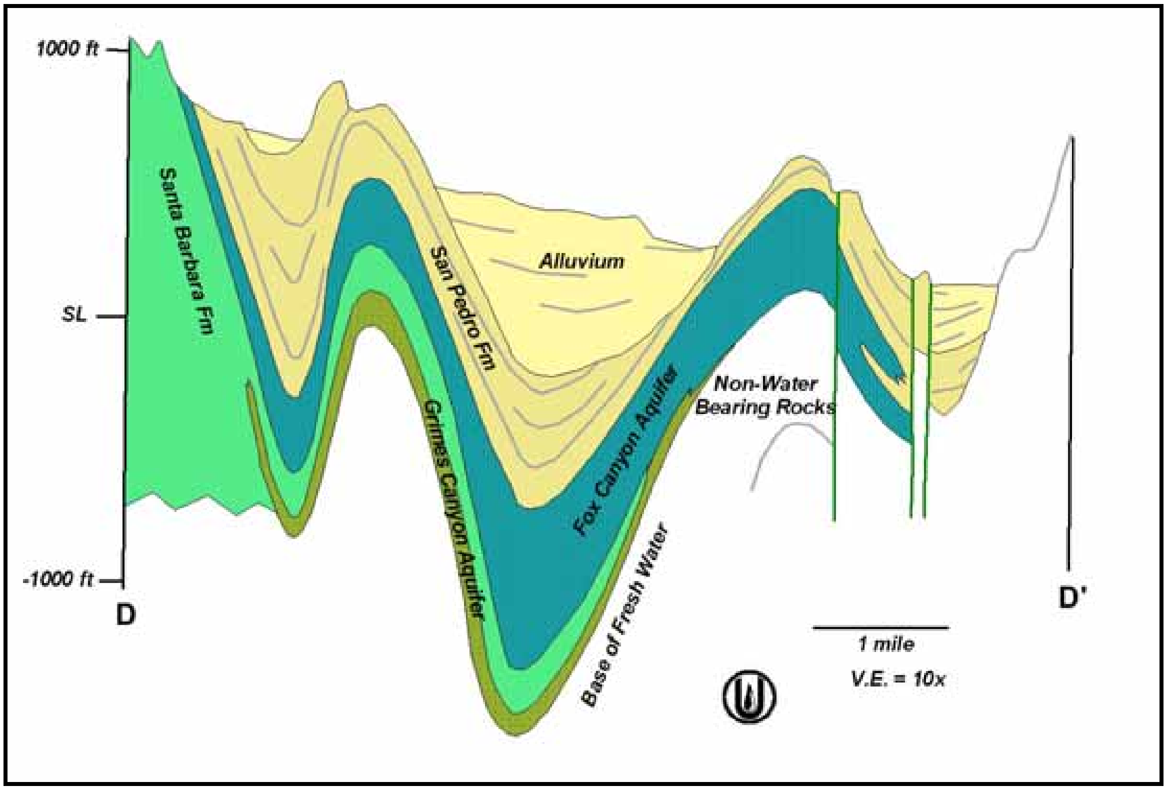


Figure 9. Geologic section D-D'. Simplified from Mukae and Turner (1975). Note ten times vertical exaggeration to accentuate stratigraphic units.

East Las Posas Basin – The East Las Posas basin is separated from the West Las Posas basin by a north-trending unnamed fault running through Somis (CH2MHill, 1993; Hanson, 1998), across which groundwater levels differ by as much as 400 feet (Figure 8). The fault also acts as a barrier to transport of saline waters from the East Las Posas basin to the West Las Posas basin (Bachman, 1999).

The source of recharge to the East Las Posas basin has changed significantly since urban development of the Simi Valley and Moorpark areas over the last 30 years. Prior to this time, recharge was predominantly from rainfall on outcrop areas and from percolation of winter floodwater along the Arroyo Las Posas. Geochemical studies show that groundwater in the central portion of the East Las Posas basin is hundreds to thousands of years old (Izbicki, 1996b), indicating a slow rate of historical recharge along the flanks of the basin. As discussed for the South Las Posas basin, urban development has brought increased discharges of both treated wastewater and shallow groundwater into Arroyo Las Posas, providing a year-round recharge source for the South and East Las Posas basins (CH2MHill, 1993; Bachman, 2002). This increased percolation from the arroyo has created a recharge mound that extends northward into the East Las Posas basin, where groundwater levels have risen by 125 ft to 200 ft during the past 30 years.

Conversely, pumping in the basin has resulted in falling groundwater levels in the eastern portion of the basin, away from the recharge mound. The largest drop in groundwater levels (190 ft) over the period 1973 to 1998 occurred in this region (Bachman, 1999). Groundwater levels have stabilized somewhat across the basin since the late 1990s, at least in part because of the addition of in-lieu and injected recharge by CMWD as part of the Las Posas Basin Aquifer Storage and Recovery (ASR) project.

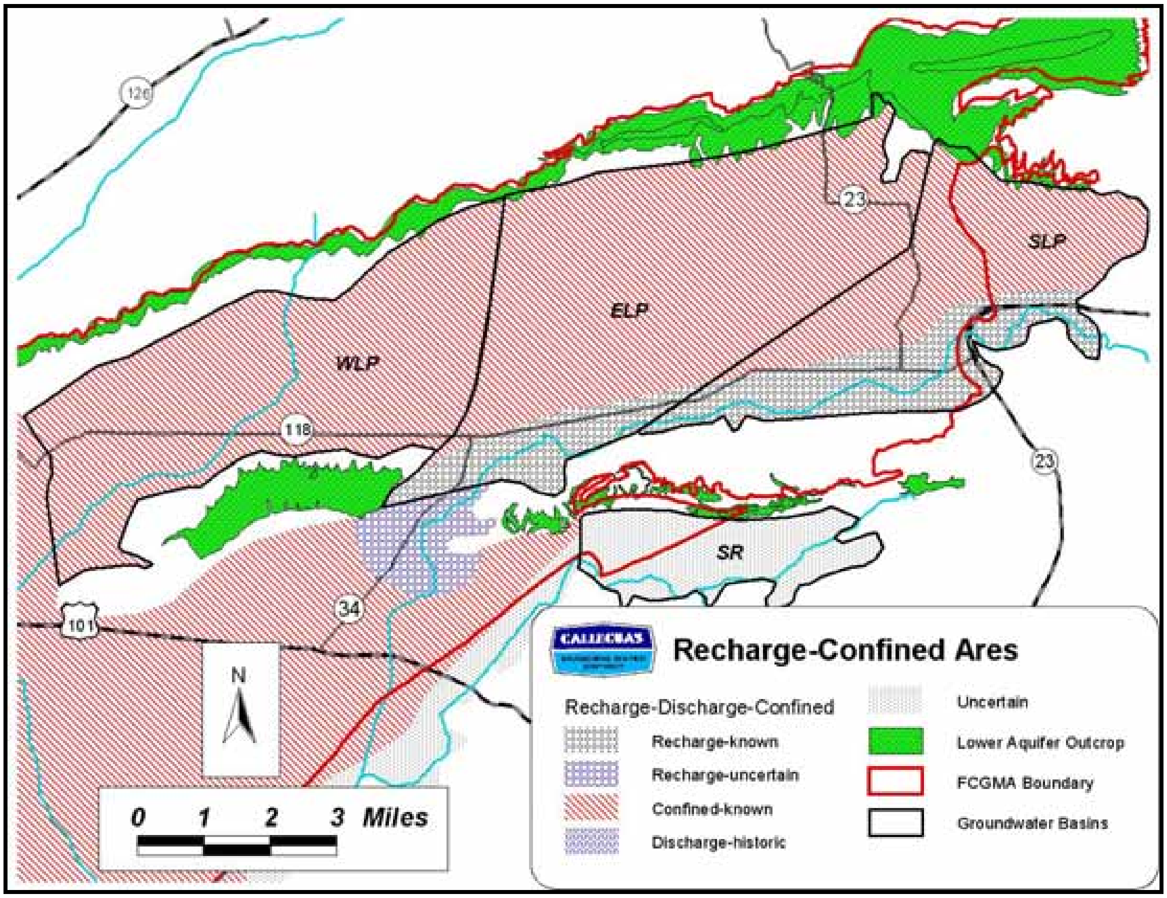


Figure 10. Recharge and discharge areas of Las Posas and Santa Rosa basins, with confined portions of the aquifers indicated. See text for discussion. Basin designations: WLP-West Las Posas, ELP-East Las Posas, SLP-South Las Posas, SR-Santa Rosa.

West Las Posas Basin – The West Las Posas basin (Figure 8) is isolated from the recharge sources of the East and South Las Posas basins by the north-south fault discussed in the previous paragraphs. Instead, the West Las Posas basin is hydrologically connected to the Oxnard Plain basin, with groundwater levels in the western portion of the basin rising and falling with wet and dry climatic cycles of recharge. Groundwater elevation contours are interpreted to extend continuously in the LAS from the Oxnard Plain basin into the West Las Posas basin, suggesting that there is no hydrologic boundary at the western end of the basin. Instead, the western boundary of the basin is defined by surface features – the end of the Las Posas Valley and the beginning of the flat terrain of the Oxnard Plain.

In the eastern portion of the basin, just to the west of the north-trending fault at Somis, a groundwater level trough that was 35 ft below sea level in 1973 had dropped to 150 ft below sea level by 1998 (the trough has since stabilized, with a slight rise in groundwater levels during the last several years). Groundwater elevations slope from their highest point at the western end of the basin to their lowest point at the eastern end of the basin, indicating that recharge water flows from the Oxnard Plain eastward into the basin. There is a flow component from the northern flank of the basin, suggesting that there is also significant mountain-front recharge.

4.0 GROUNDWATER EXTRACTIONS

The FCGMA has collected records of extraction for wells within the Agency for semi-annual periods since 1985. These extraction records are entered into a computer database, and individual wells that reported any pumping between 1985 and 1989 (known as the FCGMA "Base Period") have been assigned Historical Allocations based on those extractions. These extraction records are also used to calculate Conservation Credits and to determine pumping trends within the FCGMA.

Extractions vary from year to year (Figure 11) based largely on the amount (Figure 12) and patterns of rainfall for agricultural uses and the ratio of groundwater to imported water ordered by M&I providers in any year. This year-to-year variation makes it difficult to compare pumping from one year to the next without factoring in these climate and policy variations. However, now that there are historic records available that were gathered over at least a 20-year period, similar climatic years can be compared to determine general trends in pumping. For instance, a comparison of the dry years 1987 and 2002 (the two driest years during the 20-year period, Figure 12) indicates that overall reported pumping declined by about 37,000 acre-feet per year (164,700 to 127,700 AFY) within the Agency. Likewise, comparing average precipitation years 1988 and 2000 (Figure 12) indicates that reported pumping was reduced by 36,800 acre-feet per year (160,500 to 123,700 AFY).

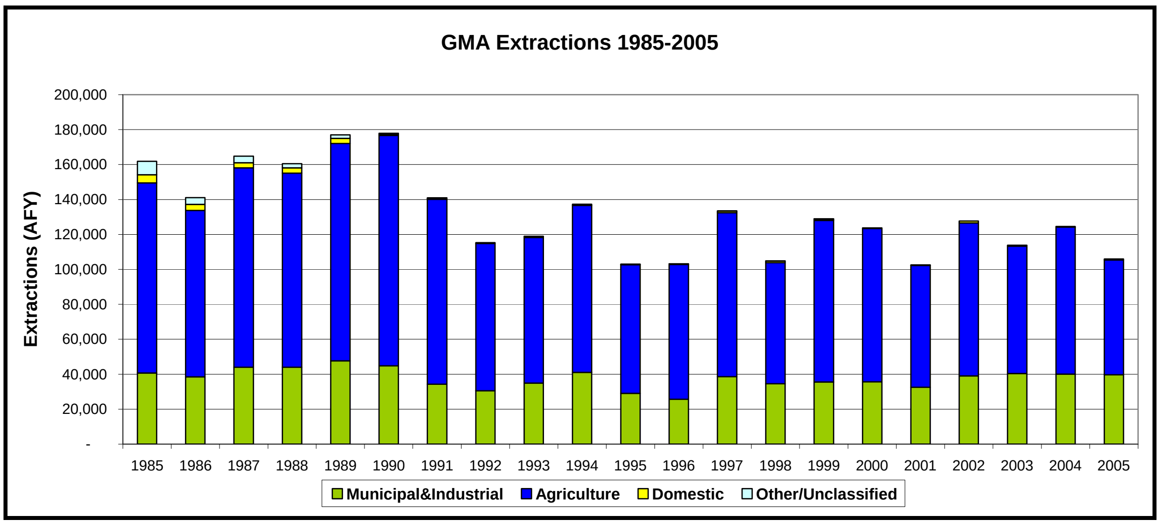


Figure 11. Reported extractions within the FCGMA for years 1985 to 2005.

This apparent decreasing trend in FCGMA pumping occurred in different fashions for agriculture and M&I. Agricultural pumping decreased earliest, following the end of the 1986-1991 drought. This decrease in agricultural pumping has also been documented by UWCD (2002) in a study of agricultural efficiencies within the FCGMA. The increased irrigation efficiency is likely the result of improved irrigation systems such as drip tape and micro sprinklers that were installed within that time frame. A portion of the decrease in agricultural pumping can also be attributed to land conversion to urban uses (see discussion below) and increased yields from the Freeman Diversion and the Conejo Creek project that supplied growers an alternative water source to pumped groundwater.

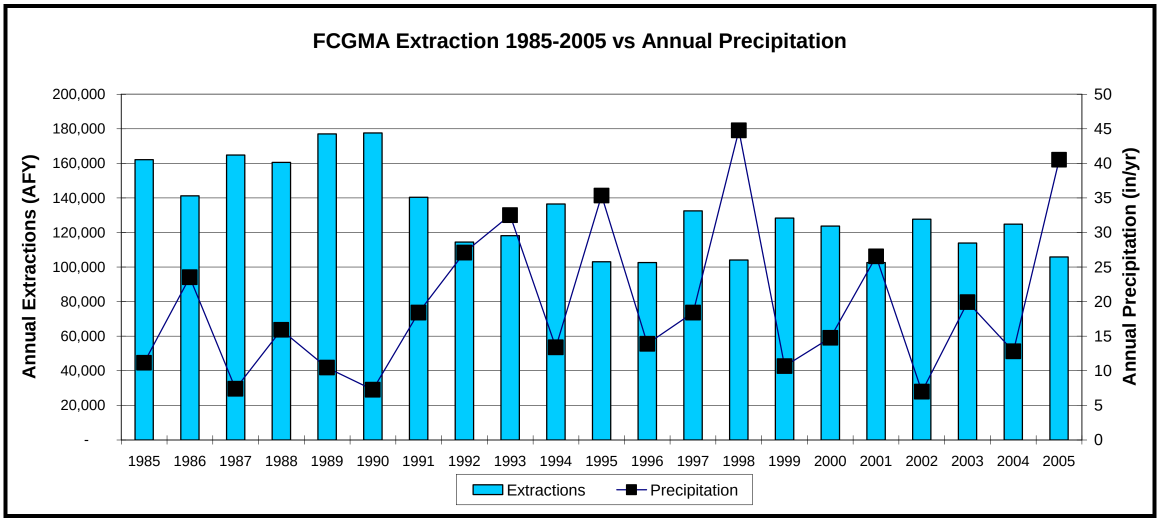


Figure 12. FCGMA extractions plotted against annual precipitation to indicate the general correlation between rainfall and extractions.

Municipal and Industrial (M&I) pumping is somewhat less affected by annual rainfall changes than agricultural irrigation. M&I pumping has been relative flat, with an average of 40,000 AFY pumped during the first decade of FCGMA reported pumping (1985-1994) and an average of 38,300 AFY pumping during the past five years (2001-2005). However, this flat pumping trend occurred as overall urban acreage increased (with an accompanying increase in potential water demand) as agricultural land has converted to urban use. An analysis of changes in land use during the period between aerial photos taken in 1998 and 2002 indicates that about 1,150 acres converted from agriculture to M&I in the Oxnard Plain and Pleasant Valley areas. At the FCGMA conversion rate of two AFY per acre, that represents about 2,300 AFY of new allocation to M&I during this four-year period.

5.0 WATER QUALITY ISSUES

Water quality issues are discussed in two parts: current issues that are evident today and potential future threats that could occur within the basins of the FCGMA if proactive steps are not taken now through management strategies.

5.1 CURRENT WATER QUALITY ISSUES

Seawater intrusion has long been the primary water concern within the FCGMA and was the problem for which the FCGMA was originally formulated to help fix. The intrusion occurs exclusively along the coastline in the Oxnard Plain basin. The U.S. Geological Survey also identified another type of saline intrusion on the Oxnard Plain – salts moving from the surrounding marine clays and older geologic units as pressure in the aquifers is reduced from overpumping. This type of intrusion may also be occurring on a minor scale in the Pleasant Valley basin. Chloride has also become a problem along Arroyo Las Posas, where groundwater from an area in the East and South Las Posas basins must be blended with lower-chloride water to meet irrigation suitability. This problem appears to have migrated downstream, with some of the City of Camarillo's wells now affected.

Chloride is also a problem in the Piru basin near the Los Angeles County line, where high chlorides from discharge of wastewater treatment plants along the Santa Clara River have degraded the recharge water for the basin. This chloride problem is currently isolated to the Piru basin, although long-term recharge of poorer quality water could eventually move through the groundwater basins along the Santa Clara River and reach the Freeman Diversion.

High nitrate concentrations in groundwater are a localized problem in the Oxnard Plain Forebay and Santa Rosa basins. In and adjacent to the Forebay, nitrates affect drinking water wells of UWCD's Oxnard-Hueneme wellfield, mutual water companies, and the City of Oxnard, particularly during and following dry periods.

5.1.1 Seawater Intrusion

High chloride levels from intrusion of seawater were induced by lowered groundwater levels that formed a distinct pumping trough in the southern Oxnard Plain (Figure 13). In 1989, the U.S. Geological Survey initiated their Regional Aquifer-System Analysis (RASA) study in a cooperative effort with local agencies. As part of this and companion cooperative studies, a series of 14 nested well sites with three or more wells installed at each site, were drilled and completed at specific depths in the Oxnard Plain, Oxnard Plain Forebay, Pleasant Valley, and Las Posas basins (Densmore, 1996). Figure 14 shows the locations of the RASA well sites on the Oxnard Plain.

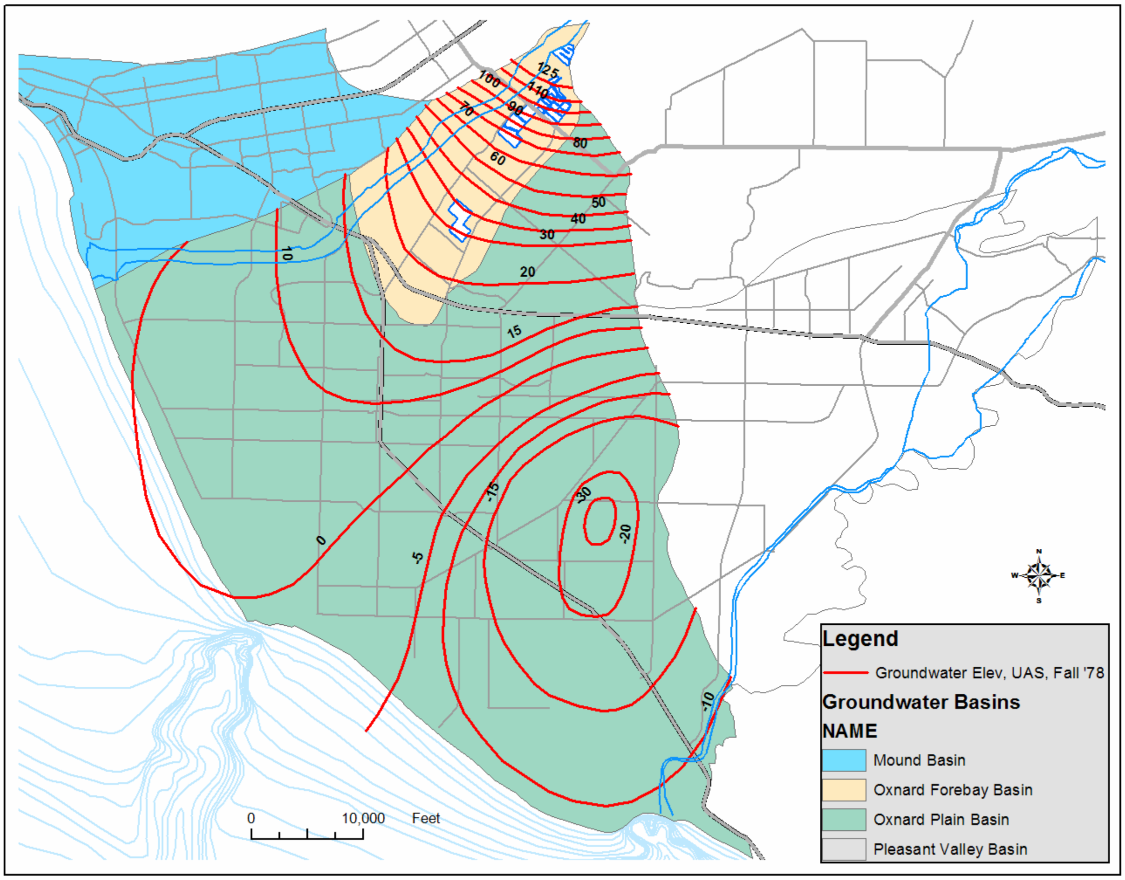


Figure 13. Groundwater elevations in the Upper Aquifer System in Fall 1978, indicating the large pumping trough in the south Oxnard Plain (water levels as much as 30 feet below sea level). This pumping trough, created by overpumping, pulled in seawater from the ocean.

Saline intrusion is recognized in monitoring wells by concentrations of chloride and Total Dissolved Solids (TDS) that are several times higher than the Basin Plan Objectives of 150 mg/L and 1,200 mg/L, respectively. In practice, the leading edge of the intrusion is mapped on the Oxnard Plain as the first occurrence of chloride in excess of 500 mg/L. In some wells that have been intruded, chloride exceeds 10,000 mg/L. The increase in chloride concentration has been rapid in some wells, increasing 1,000s of mg/L in a year or two.

Prior to the RASA study, it was believed an area extending from approximately 3 miles north of Port Hueneme to well SCE (near Highway 1) and south to Point Mugu was intruded by seawater. The installation of a dedicated monitoring network and detailed chemical analysis of water samples from the new wells and other wells yielded new interpretations on the extent of seawater intrusion on the Oxnard Plain. It is now known some areas of the southern Oxnard Plain are not intruded by seawater, but that high chloride readings from older production wells were the result of perched water leaking down failed well casings and contaminating the aquifer (Izbicki, 1992; Izbicki et al., 1995; Izbicki, 1996 a,b). As a partial result of these findings, many of the older wells on the Oxnard Plain have since been destroyed via a cooperative FCGMA-initiated program using Federal 319(h) grant money and matching funds contributed by the City of Oxnard, UWCD, FCGMA, and the County of Ventura. Figure 14 delineates the approximate extent of high-chloride water in the Oxnard aquifer (Upper Aquifer System). Figure 15 delineates the approximate extent of high-chloride water in the Lower Aquifer System.

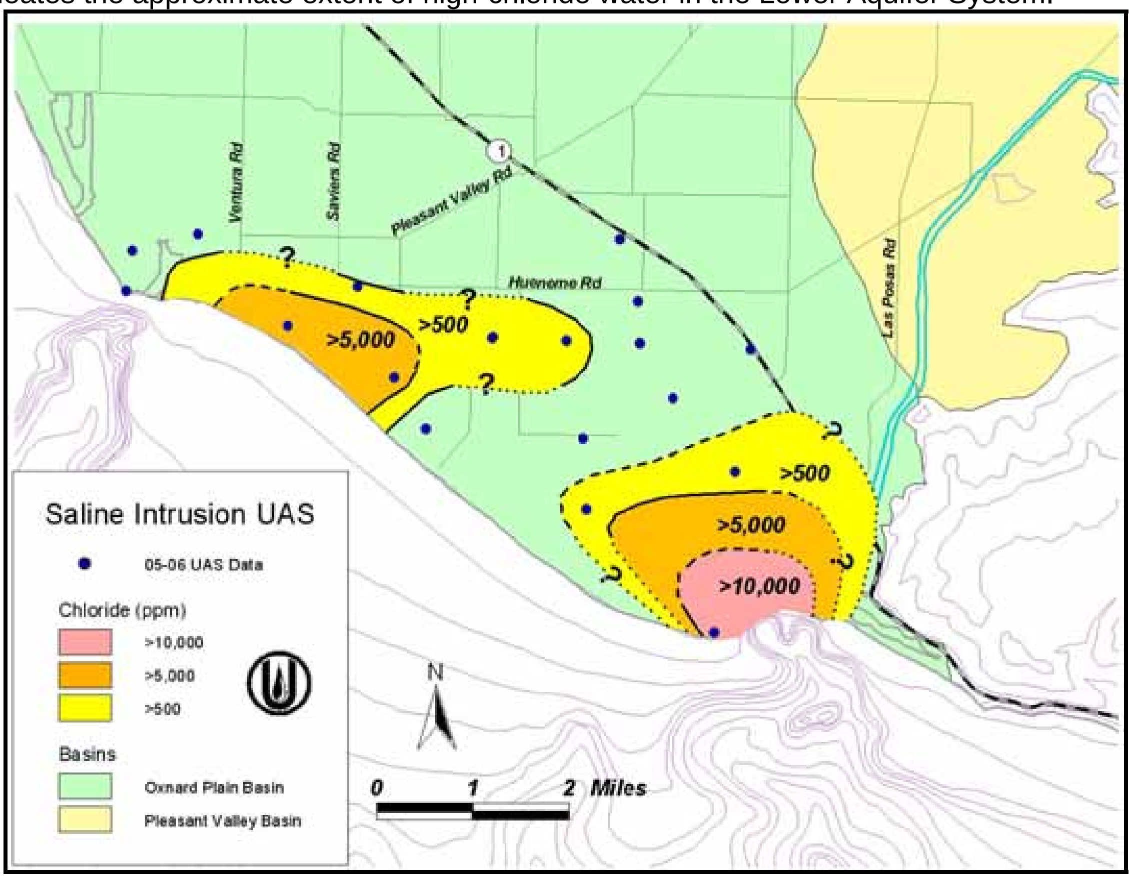


Figure 14. Areas of saline intrusion in the Upper Aquifer System of the Oxnard Plain in 2005-06. Contours of chloride concentrations indicate the maximum extent of the UAS saline intrusion – individual aquifers within the UAS may be less intruded. Contour lines are dashed where inferred and queried where uncertain. Bathymetric contour lines indicate the offshore submarine canyons where the aquifers are eroded along the canyon walls and exposed to seawater.

In addition to drilling and installing the nested monitoring wells, the USGS conducted geophysical surveys to determine the general extent of the high-saline areas (Stamos et al., 1992; Zohdy et al., 1993). This work indicated high-saline areas consisted of two distinct lobes, with relatively fresh water separating the lobes (Izbicki, 1996a). The lobes identified by the USGS form the basis of the areas of high chloride concentration shown on UWCD maps.

Additional down-hole conductivity surveys by the USGS indicate the edges of the lobes are relatively distinct, with the first saline intrusion occurring in thin individual beds of permeable sand and gravel. As intrusion continues, more individual beds or geologic layers are impacted, resulting in increasing chloride levels within the affected aquifer. Thus, the interpretation of high-chloride areas shown on the maps combine measured concentrations from the monitoring wells, geophysical measurements, and study results about the nature of the intrusion front.

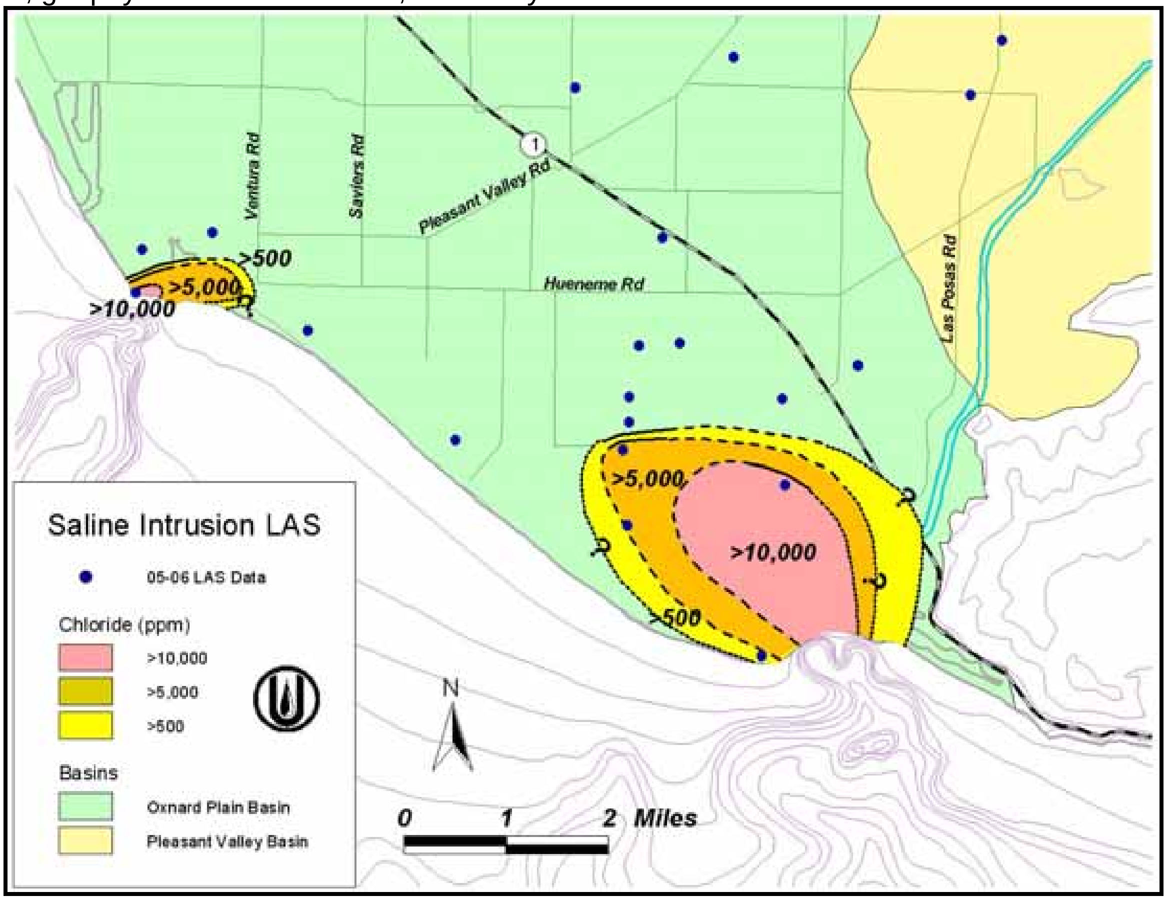


Figure 15. Areas of saline intrusion in the Lower Aquifer System of the Oxnard Plain in 2005-06. Contours of chloride concentrations indicate the maximum extent of the LAS saline intrusion – individual aquifers within the LAS may be less intruded. Contour lines are dashed where inferred and queried where uncertain. Bathymetric contour lines indicate the offshore submarine canyons where the aquifers are eroded along the canyon walls and exposed to seawater.

In addition to monitoring wells and geophysical measurements, isotope studies of groundwater samples from the nested wells indicate that the cause of the elevated chloride levels varies in the Oxnard Plain basin (Izbicki, 1991, 1992). Four major types of chloride degradation were documented:

> **Lateral Seawater Intrusion** - the inland movement of seawater adjacent to the Hueneme and Mugu submarine canyons.
>
> **Cross Contaminatio**n - the introduction of poor-quality water into the fresh water supply via existing well bores improperly constructed or improperly destroyed, or via corroded casings caused by poor-quality water in the Semi-Perched zone.

Salt-Laden Marine Clays - the dewatering of marine clays, interbedded within the sand and gravel-rich aquifers and containing salts from their marine deposition, yields high concentrations of chloride-enriched water. This dewatering is the result of decreased pressure in the aquifers, caused by regional pumping stresses (excessive groundwater withdrawals).

Lateral Movement of Brines from Tertiary-Age Geological Formations - the lateral movement of saline water from older geologic formations caused by uplift along faults. An example is where older Tertiary rocks are in contact with younger aquifers across a buried fault face near Pt. Mugu.

5.1.2 Saline Intrusion from Surrounding Sediments

A significant portion of the salinity in the aquifers of the Oxnard Plain basin is coming from salts (primarily chloride) pulled from the surrounding sediments, as discussed in the previous section. When this saline intrusion occurs near the coastline, it largely resembles seawater intrusion in concentration and movement in the aquifer, and mitigation measures are similar to those for seawater intrusion (i.e., raising groundwater levels). In more inland areas such as the Pleasant Valley basin, chloride concentrations are generally less, with only a few wells showing any increase in chloride. It is too early to know whether chloride concentrations in the Pleasant Valley basin will escalate to a problem affecting local pumpers.

5.1.3 High Salinity Associated with High Groundwater Levels

Increased salt concentrations (chloride, sulfate, sodium) in aquifers underlying the Arroyo Las Posas in the East Las Posas, South Las Posas, and northern Pleasant Valley basins correspond in time with rising groundwater levels along the arroyo. This rise in groundwater levels has been created by increased recharge as natural streamflow was augmented by the addition of the upstream discharge of treated wastewater and aquifer dewatering projects along the arroyo. The shallow groundwater levels, which are higher than any historic levels, apparently leach salts from the previously unsaturated portions of the aquifer. The problem caused by high groundwater levels in the shallow aquifer has migrated down Arroyo Las Posas across the Las Posas basin and into the northern part of the Pleasant Valley basin, where water levels have risen and salts have increased. Solutions to this salinity problem will likely be based on removing and treating the high-salinity water.

5.1.4 Nitrate in Groundwater

High nitrates in groundwater primarily affect the Oxnard Plain Forebay and Santa Rosa basins. Nitrate is a primary drinking water standard (45 mg/L as NO3), so high nitrate concentrations directly affect the potable water supply. Nitrate is largely introduced into groundwater by man's activities in overlying recharge areas where the nitrate travels directly into the aquifers. Nitrate concentrations typically are a balance between nitrate input and the amount of recharge water available for dilution. Nitrate concentrations commonly increase during dry periods when there is less recharge water for dilution. In groundwater away from recharge areas, nitrates have generally been diluted and are at concentrations well below drinking water standards. An exception to this occurred in the 1990s, when nitrate occurred in City of Oxnard wells in the Oxnard Plain basin, just outside of the Forebay basin. This nitrate may have migrated downward from the Semi-Perched zone through improperly abandoned private wells.

The primary sources of nitrate are septic systems (especially if they are poorly maintained or being used above design capacity) and agricultural fertilizer. These are both being addressed.

As discussed below, septic systems have been prohibited in the Oxnard Plain Forebay basin. In addition, agricultural nitrate, contributed largely from fertilizers, will be monitored in 2006 as part of the Agricultural Irrigated Lands Conditional Waiver program adopted by the Los Angeles Regional Water Quality Control Board. If nitrates are shown to be entering groundwater from agricultural fertilizers through the monitoring program, the waiver requires the implementation of Best Management Practices.

5.2 WATER QUALITY ISSUES BY BASIN

5.2.1 Oxnard Plain Forebay Basin

The primary water quality concern in the Oxnard Plain Forebay basin is nitrate concentrations above the Department of Health Services' Maximum Contaminant Level. Nitrate concentrations in the Upper Aquifer System spike in the Forebay basin during dry periods when there is reduced recharge to the basin. Nitrate concentrations periodically exceed the primary drinking water standard of 45 mg/L (as NO3) in individual wells (Figure 16). Because much of the pumping in the Forebay delivers potable water through the Oxnard-Hueneme (O-H) pipeline (a potable water delivery line that provides groundwater to the cities of Oxnard and Port Hueneme), the drinking water standard is of prime importance. The O-H system has been able to deliver potable water by blending lower-nitrate water and by temporarily shutting down impacted high-nitrate wells.

These nitrates have been attributed to both agricultural activities (fertilizer application) and adjacent septic systems (leach-line effluent discharges). The nitrate problem will continue to be a water quality issue for drinking water wells as long as the sources of nitrate continue to contribute this mineral salt into the groundwater resources. As a result of the high nitrate concentrations, the Regional Water Quality Control Board enacted in 1999 a prohibition on septic systems in portions of the Forebay, with orders that most such disposal systems be eliminated from the Oxnard Plain Forebay basin before 2008. Since that time, disconnecting the nearby El Rio septic tanks and connecting to a sanitary sewer system has been a high priority water quality improvement project for the County.

5.2.2 Oxnard Plain Basin

The significant water quality issue in the Oxnard Plain basin is saline intrusion from both seawater and from surrounding marine sediments. Chloride degradation is directly related to groundwater levels in the basin. The water balance of the Oxnard Plain and the offshore component of the aquifer units is a dynamic balance between groundwater recharge, groundwater extraction, and change in aquifer storage. High groundwater levels in the recharge zone in the Oxnard Plain Forebay basin exert a positive pressure on the confined aquifers of the Oxnard Plain, and water flows from the recharge areas toward the coast (Figure 17). Whereas the pressure exerted by high water levels in the Forebay propagates rapidly through the aquifers, the actual movement of the water itself is slow, at approximately 3 feet per day or less in the Forebay (Izbicki et al, 1992). The pressure (piezometric) surface of the confined aquifer is diminished by the extraction of water from the system. If pressure heads at the coast fall below sea level, the lateral intrusion of seawater will occur. The dewatering of marine clays can occur if heads in the surrounding sediments remain below their historic levels for prolonged periods.

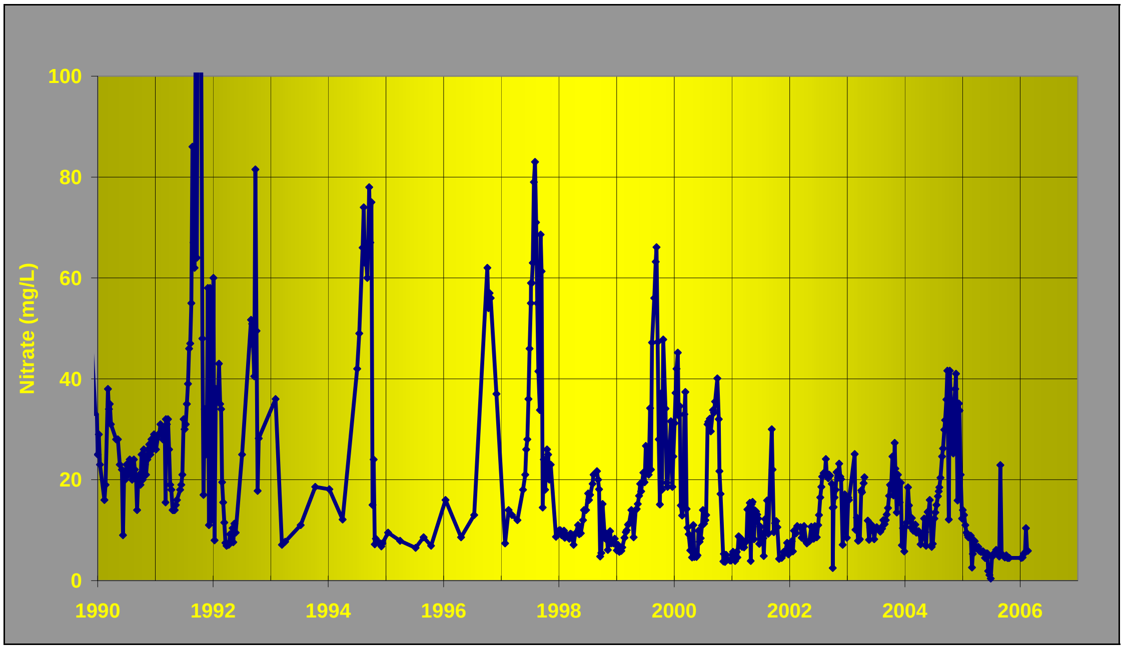


Figure 16. Nitrate concentrations (as NO3) in Oxnard-Hueneme El Rio well #5. Note that nitrate increases during dry portion of year, when nitrate input from overlying land uses is less diluted by low-nitrate recharge water. When nitrate levels are high, this well is either not used or the produced groundwater is diluted with low-nitrate water from other wells in the system.

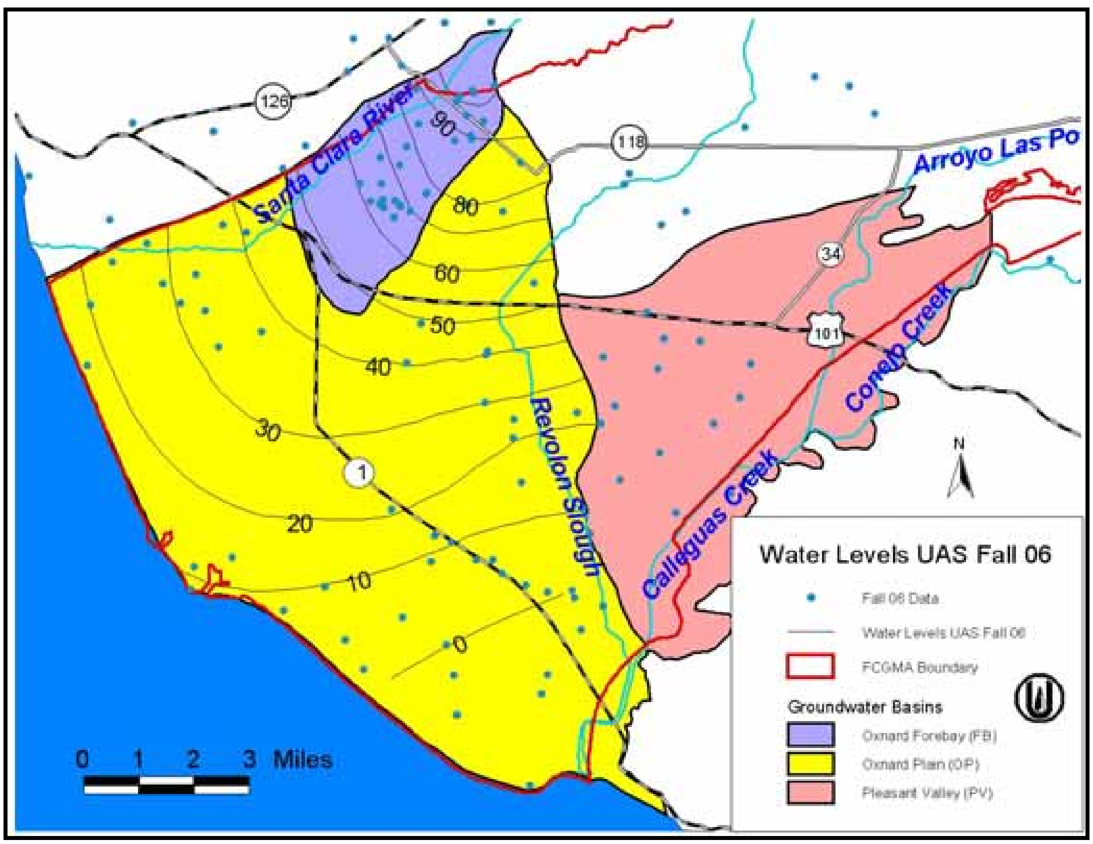


Figure 17. Groundwater elevation contours in the Upper Aquifer System, Fall 2006. Note that southeastern portion of Oxnard Plain remains below sea level (line labeled "zero") and is susceptible to continued seawater intrusion.

Chloride levels in coastal monitoring wells in the Upper Aquifer System show a direct relationship to groundwater levels – with groundwater levels below sea level, chloride levels increased in the early 1990s (e.g., well A1 in Figure 18). However, as the Freeman Diversion on the Santa Clara River began operation in 1991 and a series of wet years followed, the amount of recharge to the former pumping trough area and to the Port Hueneme area increased significantly. This has resulted in a rise in groundwater elevations on the Oxnard Plain and drastic reduction in seawater in some coastal monitoring wells (e.g., well A1 in Figure 18). In fact, the significantly intruded well A1 has returned to its pre-intrusion water quality levels and is currently (2006) within drinking water standards. This may be the first documented instance of such a reversal of seawater intrusion in a coastal basin.

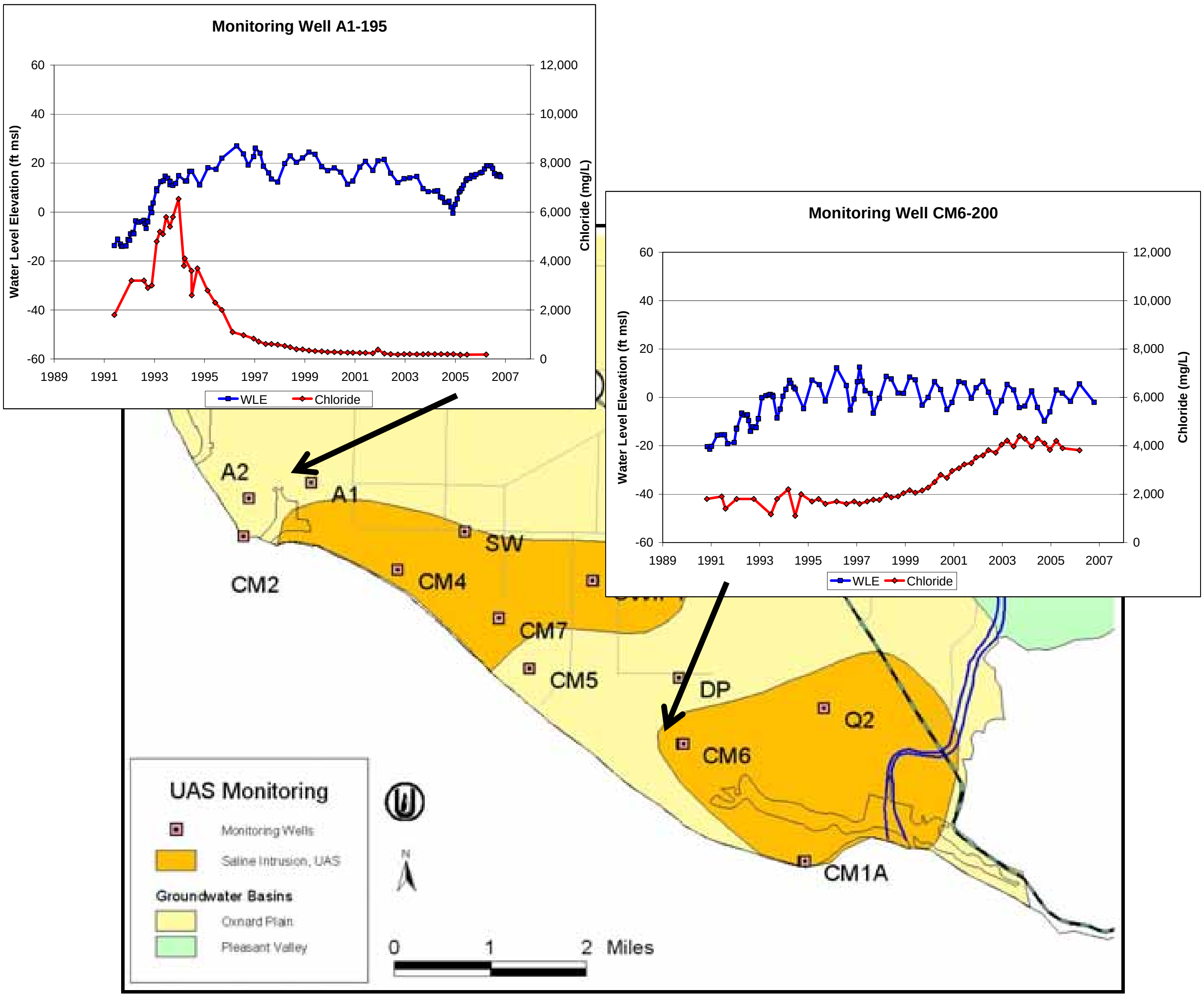


Figure 18. Chloride levels in two Upper Aquifer System coastal monitoring wells. Note that chloride levels have improved to drinking water quality in the A1 well (Port Hueneme lobe), whereas chloride levels continue to increase in the Point Mugu lobe. Uncertainties in exact configuration of saline lobes are indicated in Figure 14.

Despite some encouraging gains, however, the Upper Aquifer System is not completely restored. Although high recharge rates related to the increased flows from the Freeman Diversion have improved water levels and water quality south to Port Hueneme and the higher water levels appear to have eliminated the pumping trough, groundwater levels are still at or below sea level (Figure 17) and water quality continues to degrade in the southern portion of the Oxnard Plain near Point Mugu (e.g., well CM6 in Figure 18). It is likely that the pumping trough situation is similar to the one discussed next for the Lower Aquifer System – namely, that this portion of the Upper Aquifer System may be too far from the recharge areas for direct recharge to be effective, and must rely on artificial or in-lieu (surface water delivered and used in-lieu of pumping groundwater) recharge methods to transport replacement water from the Oxnard Plain Forebay basin or other sources of supply. Groundwater levels in the Lower Aquifer System in the south and southeast Oxnard Plain and central and southern portions of the Pleasant Valley areas have been consistently below sea level since at least the early 1950s (Mann, 1959)(Figure 19). The strategy to switch pumping from the Upper Aquifer to the Lower Aquifer has apparently been at least a portion of the cause for the low water levels and high chlorides that were encountered when the RASA monitoring wells were completed at LAS depths. These high chloride levels occur in several wells at the position of the two Upper Aquifer System seawater lobes (Figure 20).

U.S. Geological Survey studies indicated that the chloride in the LAS occurred not just from seawater intrusion, but also from slow dewatering of the surrounding volcanics and older sediments, as well as chloride-rich marine clays that serve as the aquitard between the Upper and Lower aquifer zones. After the U.S. Geological Survey findings became known and there was the realization the shift in pumping was actually mining LAS groundwater, the County of Ventura took action to change the County Well Ordinance (May 1999) so that only replacement wells or special situations would be allowed to draw water from the LAS; new wells would have to be drilled in the UAS.

The decline in Lower Aquifer System water levels from the late 1980s into the 2000s exacerbated a pumping trough extending from the coastline northeastward to the city of Camarillo (Figure 19). This trough is typically well below sea level, with the deepest portion as much as 180 feet below sea level during the drought of the late 1980s and early 1990s. Despite above-average rainfall in many of the preceding ten years, this pumping trough was still as much as 100 feet below sea level in the fall of 2006 (Figure 19).

Although FCGMA policies and new UWCD recharge facilities built over the last 20 years have significantly improved conditions in the Upper Aquifer System, the Lower Aquifer System continues to experience intrusion by saline waters. This saline intrusion comes both from seawater entering the aquifers along the coastline and from saline waters intruded from surrounding sediments. Any solution to this saline intrusion must include raising water levels in the Lower Aquifer System while concurrently keeping water levels in the Upper Aquifer System at their current elevations. One of the biggest groundwater challenges is to provide either additional recharge or an alternative source of water to the south Oxnard Plain and Pleasant Valley to prevent further water quality degradation in the Lower Aquifer System.

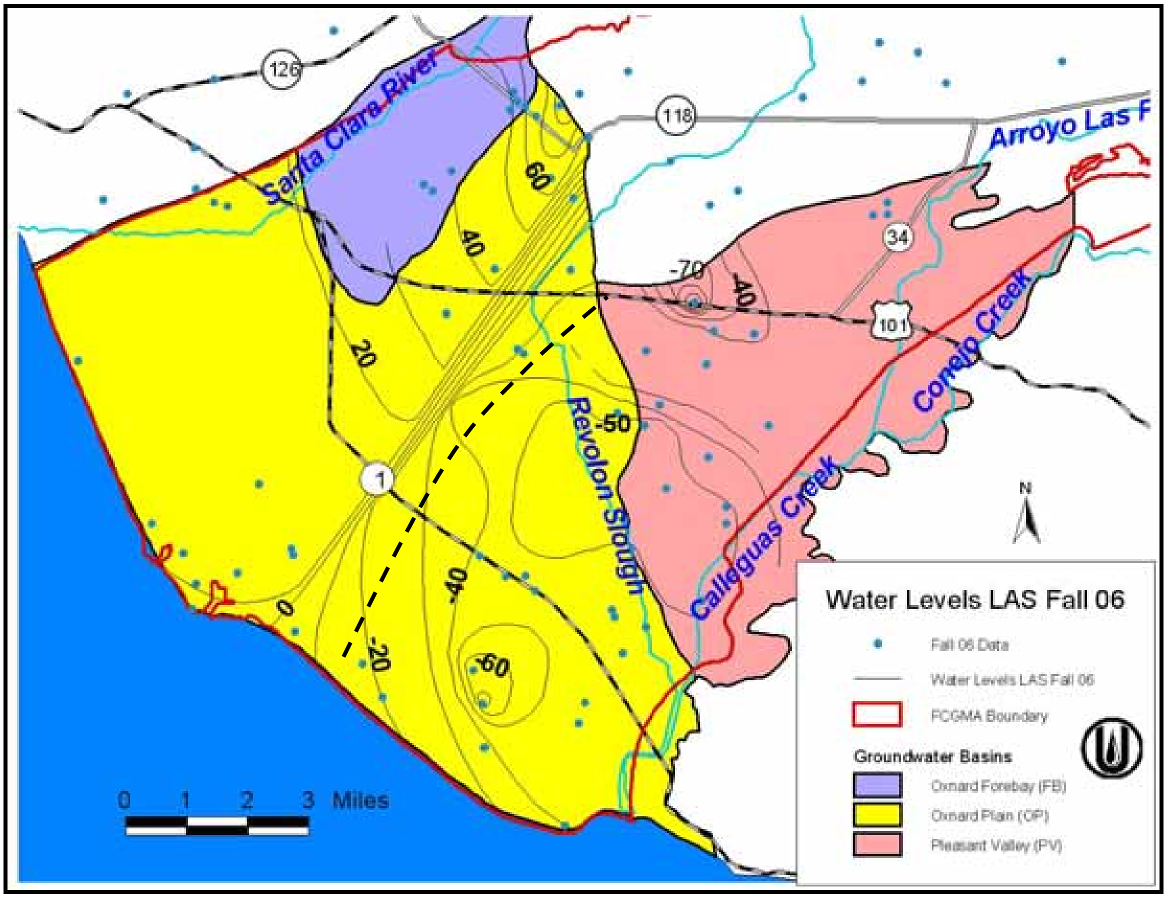


Figure 19. Groundwater elevation contours in the Lower Aquifer System, Fall 2006. Note the distinct series of troughs that extend from the ocean in the south Oxnard Plain northeastward toward Camarillo. These troughs are entirely below sea level. The dashed line indicates the approximate trend of the steep groundwater flow gradients that separate the recharge area in the Forebay from the south Oxnard Plain and Pleasant Valley pumping trough.

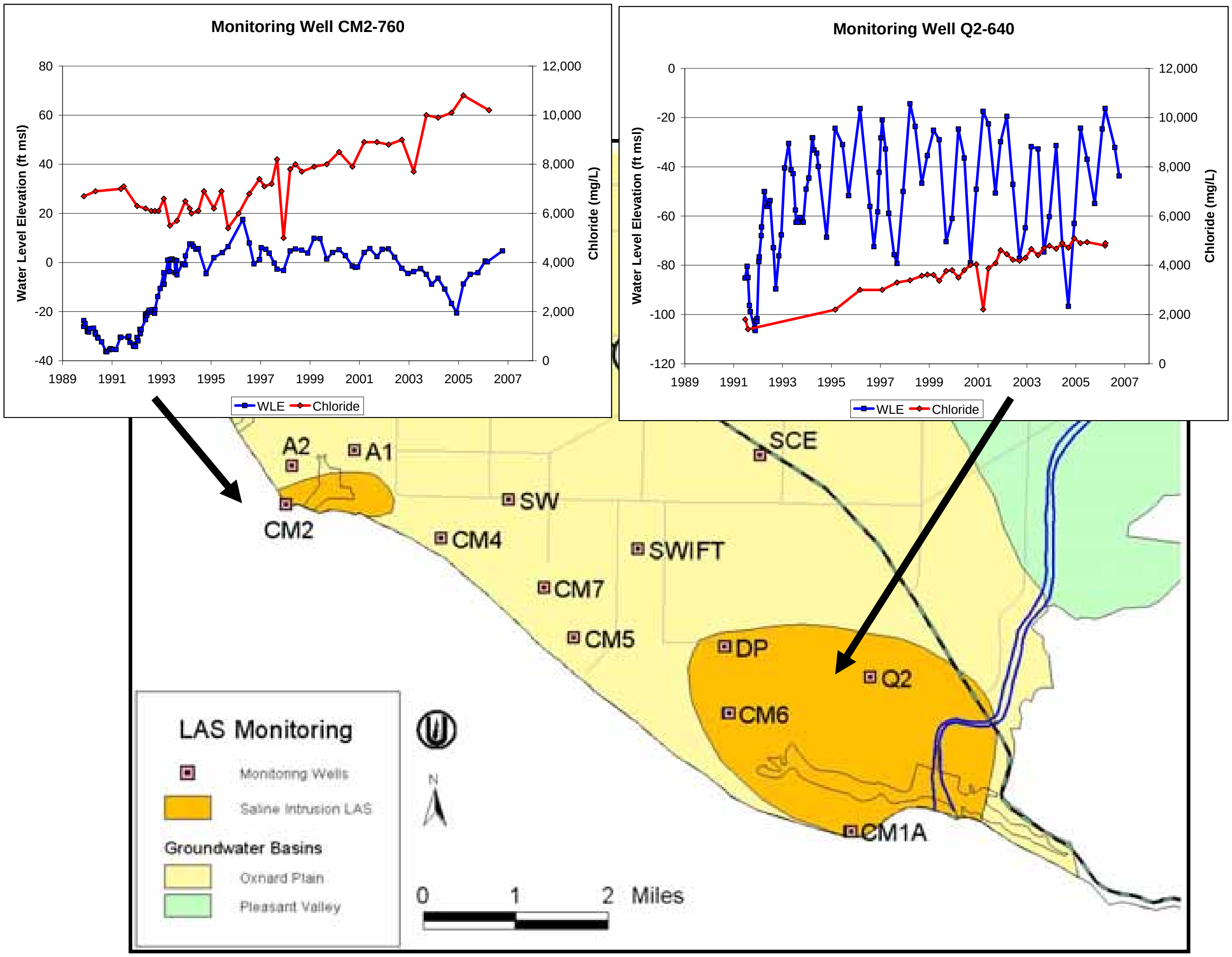


Figure 20. Chloride levels in two Lower Aquifer System coastal monitoring wells. Chloride levels continue to rise in the Point Mugu lobe, requiring new monitoring wells to be drilled inland of current wells to determine the extent of landward movement of high-chloride groundwater. Uncertainties in exact configuration of saline lobes are indicated in Figure 15.

5.2.3 Pleasant Valley Basin

Saline intrusion from surrounding sediments and salinity associated with high groundwater levels are the primary water quality concern in the Pleasant Valley basin. The potential for saline intrusion exists in the depressed groundwater elevations in the Lower Aquifer System of the Pleasant Valley basin (see previous section for discussion of these depressed groundwater levels). The area of depressed groundwater elevations extends from the City of Camarillo to the ocean (Figure 19). Chloride levels within the Pleasant Valley basin are generally less than 150 mg/L, but several wells have shown an increase in chloride. City of Camarillo wells near the Camarillo airport have been affected by the rising chlorides, with one well taken out of service. Increasing chlorides in other wells in the Pleasant Valley basin have recently been shown to have the geochemical signature of "oil-field production water" that underlies the fresh-water bearing aquifers in the basin (Izbicki et al., 2005). This poor-quality water likely was pulled up along fault zones or other conduits towards the lower pressures of the LAS aquifer that were created by overpumping of the basin.

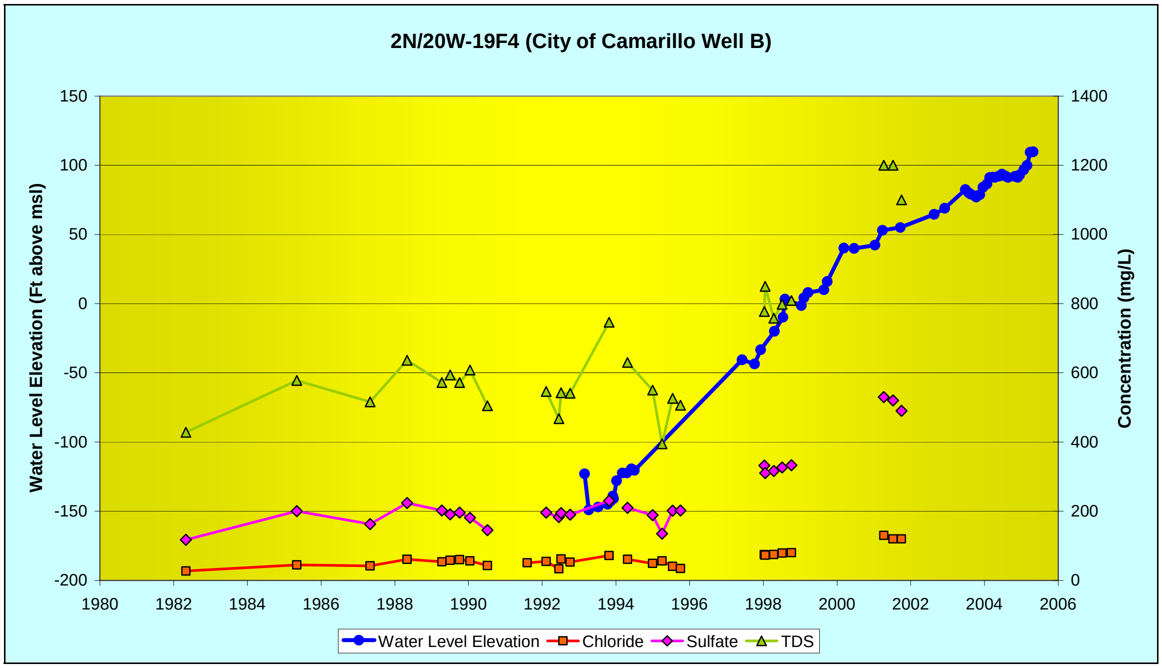


Figure 21. Salts increasing with groundwater elevations, northern Pleasant Valley basin.

Where Arroyo Las Posas crosses into the Pleasant Valley basin in the northern area of the City of Camarillo, the increased flows in the arroyo have raised groundwater levels in the area to historic highs (Figure 21). Coincident with this, water quality has degraded, especially for the constituents sulfate, chloride (Figure 21), iron, and manganese. As in the South Las Posas basin, this higher-salinity water will need to be treated for potable or irrigation use. The City of Camarillo has evaluated the feasibility of treating this poor-quality water, while reducing pumping in the areas of depressed groundwater levels (discussed in section 9.3 *Development of Brackish Groundwater, Pleasant Valley Basin*).

5.2.4 Santa Rosa Basin

The Santa Rosa basin has had long periods where nitrates in some areas were well above drinking water standards (as high as 200 mg/L). Chloride concentrations in the basin are generally between 100 and 150 mg/L, although they have spike locally above 200 mg/L. High chloride concentrations can affect crop production.

5.2.5 West Las Posas Basin

The water quality of the West Las Posas basin currently meets standards for irrigation and drinking water use. Within the pumping depression in the far eastern portion of the basin, samples from two wells have had increased chloride concentrations since 2004. It is not clear if this is the beginning of a trend or if these chlorides were transported into the basin from the shallow aquifer that is generally located along Arroyo Las Posas in the East Las Posas basin (the wells themselves are not along the arroyo).

5.2.6 East Las Posas Basin

Increasing concentrations of salts (chloride, sulfate, sodium) in the portion of the basin along the Arroyo Las Posas continue to be a problem in the East Las Posas basin. Chloride concentrations in the shallow aquifer beneath the arroyo can reach 360 mg/L, whereas chloride concentrations in the surface waters in the arroyo are in the range of 120-180 mg/L (Bachman, 2002). These increased chloride concentrations in the shallow aquifer are associated with historically-high groundwater levels (see discussion in section 5.1.3 *High Salinity Associated with High Groundwater Levels*) that apparently leach salts from previously-unsaturated sediments in the shallow aquifer along the arroyo. The groundwater that contains these chloride-rich salts recharges the Lower Aquifer System by moving downward from the shallow aquifer into the LAS, then northward into the basin. This recharge has formed a chloride-rich recharge mound beneath the Arroyo Las Posas (Figure 22) and northward into the main portion of the East Las Posas basin (Bachman, 2002). Individual wells along the south flank of the basin show a progression of filling of the shallow aquifer, with a coincident increase in chloride concentration (Figure 23). The following section on the South Las Posas basin discusses the age progression of this filling.

5.2.7 South Las Posas Basin

Water quality in the South Las Posas basin is dominated by the movement of salts discussed in the previous section. The filling of the shallow aquifer of the South Las Posas basin progressed from the upstream to the downstream portions of the basin (
Figure 24). With continuing dissolution of salts in the previously-unsaturated sediments, water quality could improve as the salts are expended. Two wells completed in the shallow aquifer beneath the arroyo that have had elevated salts for 20 years have shown a lessening of salinity in the past two years. It is not yet clear if these wells may be a precursor of further salt reduction as salts in the sediments are dissolved and the shallow aquifer begins to reflect the chemistry of surface water in the arroyo (which is higher in chlorides than pre-development conditions, but lower than the groundwater with dissolved salt).

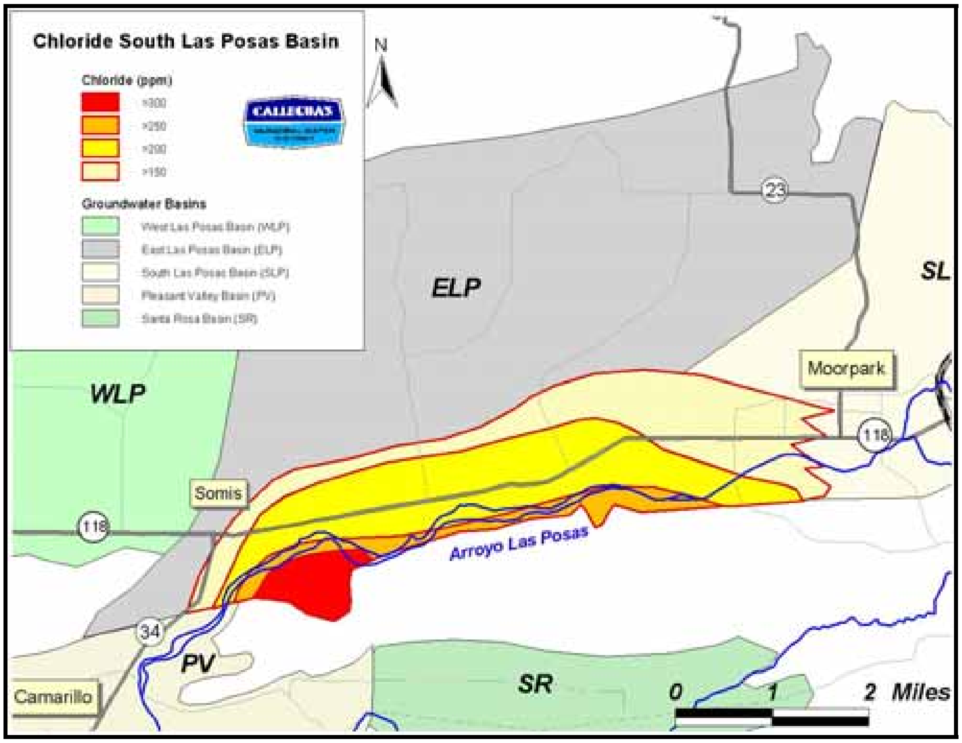


Figure 22. Chloride concentrations (2005-06) in aquifers beneath the Arroyo Las Posas in the East and South Las Posas basins. These concentrations have increased during the last two decades as the shallow aquifer beneath the arroyo has filled to its spill point, caused by increased flow in the arroyo from discharges from dewatering wells and wastewater treatment plants. (Bachman, 2002).

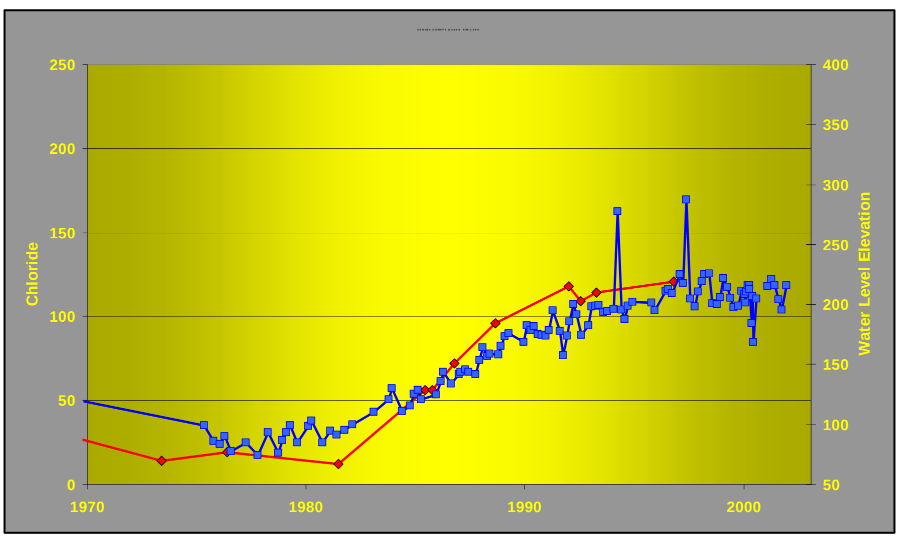


Figure 23. Coincidence of groundwater level rise (blue line with squares) and chloride concentrations (red line with diamonds) in a well in the shallow aquifer along Arroyo Las Posas (Bachman, 2002).

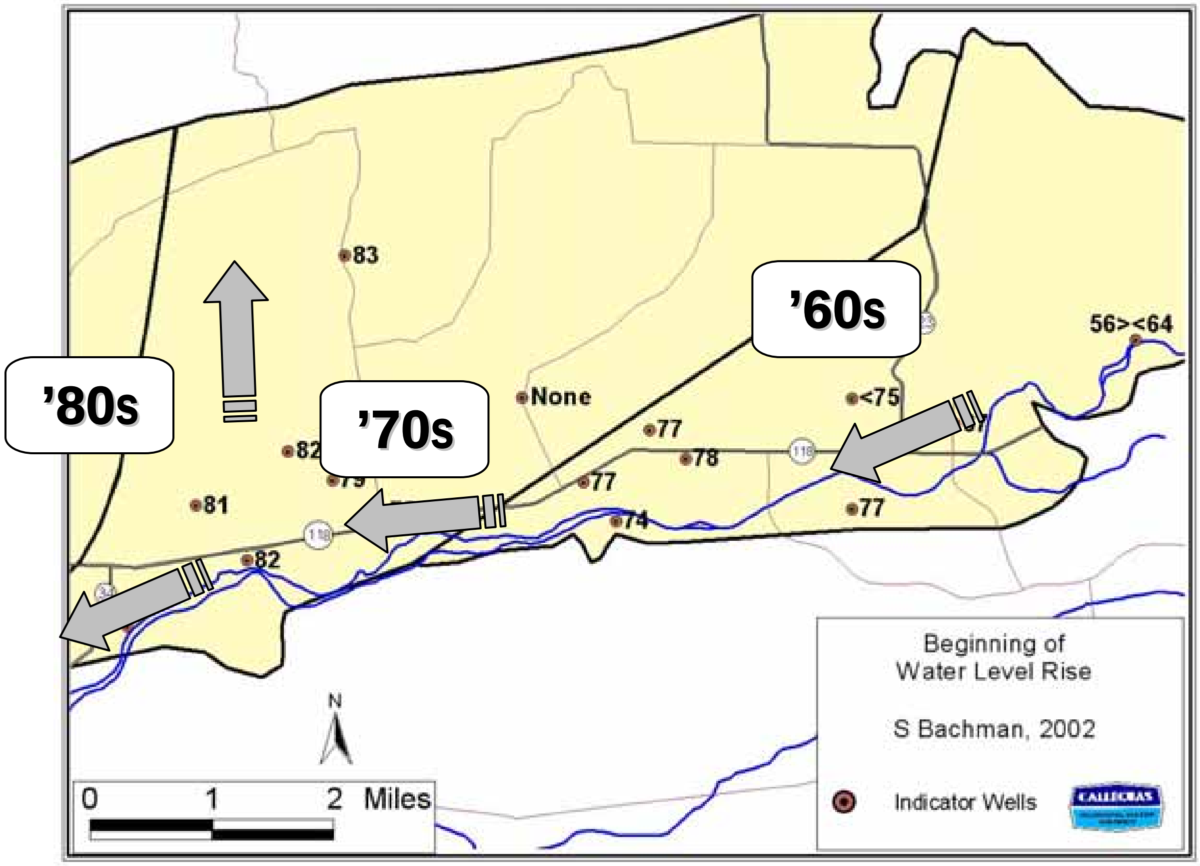


Figure 24. Beginning time of the progressive filling of the shallow aquifer along the Arroyo Las Posas in the South and East Las Posas basins. The number next to each well is the year when groundwater levels started to rise during the filling episode.

5.3 POTENTIAL FUTURE WATER QUALITY THREATS

An area of concern, discussed in the previous section, is potential water quality problems in the Pleasant Valley basin. With groundwater elevations as low as 160 feet below sea level, there exists the potential to pull significant amounts of lower-quality water from surrounding sediments, across or along faults, and from deeper depths (high salinity and/or petroleum-tainted water). Mitigation of these low water levels is important to avoid future water quality problems.

In the northern portion of the Pleasant Valley basin, within the City of Camarillo, increasing chloride concentrations could migrate into the main portion of the basin. However, the details of the hydrogeologic connections from the shallow aquifer to the Lower Aquifer System are still somewhat unclear. Likewise, salt-laden groundwater in proximity to California State University Channel Islands could also migrate from the shallow aquifers to deeper aquifers. This connection is also not well known and the mechanics of transport have yet to be adequately determined, although water level and quality monitoring from wells in the vicinity of the university suggests that the water quality in Lower Aquifer System wells is not affected by poor-quality water in the shallow aquifers. This suggests some barrier to vertical flow between the aquifers in this area.

There are also several other potential water quality concerns within the FCGMA basins. There is a number of leaking underground tanks, some of which have polluted the main aquifers in the basins. Past contamination has been localized and has been addressed through various clean-up operations mandated by the Los Angeles Regional Water Quality Control Board and the Ventura County Environmental Health Department. Water purveyors have become directly involved to ensure rapid cleanup operations in some areas. The FCGMA has lent it support to some of these efforts by water purveyors. There are also possibilities of more-widespread contamination by plumes of such contaminants as perchlorate. Large releases of perchlorate have occurred in the Santa Susana Mountains adjacent to Simi Valley and along the Santa Clara River in Santa Clarita (Los Angeles County). The FCGMA may have to be proactive in the future in ensuring that these and other potential sources do not adversely affect the FCGMA aquifers.

A matter of future water quality concern is the maintenance of current recharge projects that positively affect the Oxnard Plain. Environmental issues in the Santa Clara River and its tributary Piru Creek have the potential for reducing useable water resources – the amount of water available from stored water in Lake Piru and river water at the Freeman Diversion. Since these projects play an integral role in the current FCGMA water management strategies, any loss of yield from these projects would likely reduce some of the gains used in mitigating saline intrusion within the Oxnard Plain.

6.0 BASIN MANAGEMENT OBJECTIVES

6.1 CURRENT OBJECTIVES

Basin Management Objectives (BMOs) are quantitative targets established in a groundwater basin to measure and evaluate the health of the basin. For groundwater basins with seawater intrusion, a critical BMO is maintaining groundwater levels along the coastline to prevent the further intrusion of seawater. In addition, another BMO would be to maintain low concentrations, to the extent possible, of chloride at critical coastal monitoring wells. In inland areas, a BMO would be to ensure groundwater levels prevent conditions that cause groundwater quality degradation. A concurrent BMO would be to maintain concentrations of deleterious chemical constituents in groundwater, such as nitrate and chloride, at or below levels that are harmful to human or animal health or damaging to irrigated crops. Within the FCGMA, several BMOs are appropriate to measure and evaluate the health of the basins. Wells used as monitoring points for the Basin Management Objectives are shown in Figure 25 and described in the following paragraphs.

As part of the BMO attainment process, additional wells may be added to the monitoring process to provide early indications of improving or degrading aquifer conditions at critical locations. An example of such location would be at the north end of the Pleasant Valley Basin where poor quality water from the Las Posas Basin is apparently beginning to enter the Pleasant Valley Basin. This will be an iterative process that will allow the FCGMA to monitor both the current conditions and the relative success of basin management strategies implemented to control water quality in these areas.

6.1.1 Oxnard Plain Basin

The BMO most critical for coastal areas of the FCGMA is the maintenance of groundwater elevations high enough to prevent further seawater intrusion. Because the source of seawater is likely from offshore submarine canyons where the aquifers are truncated and in contact with seawater, coastal aquifers must have groundwater elevations high enough to prevent movement of seawater from the canyons to nearby onshore areas (see discussions in section 5.1.1 *Seawater Intrusion* and section 5.2.2 *Oxnard Plain Basin*). However, seawater is denser than fresh water and the heavier seawater exerts pressure on the fresh water aquifers exposed on the canyon walls – much like water pressure pushes on a diver's mask when the diver descends.

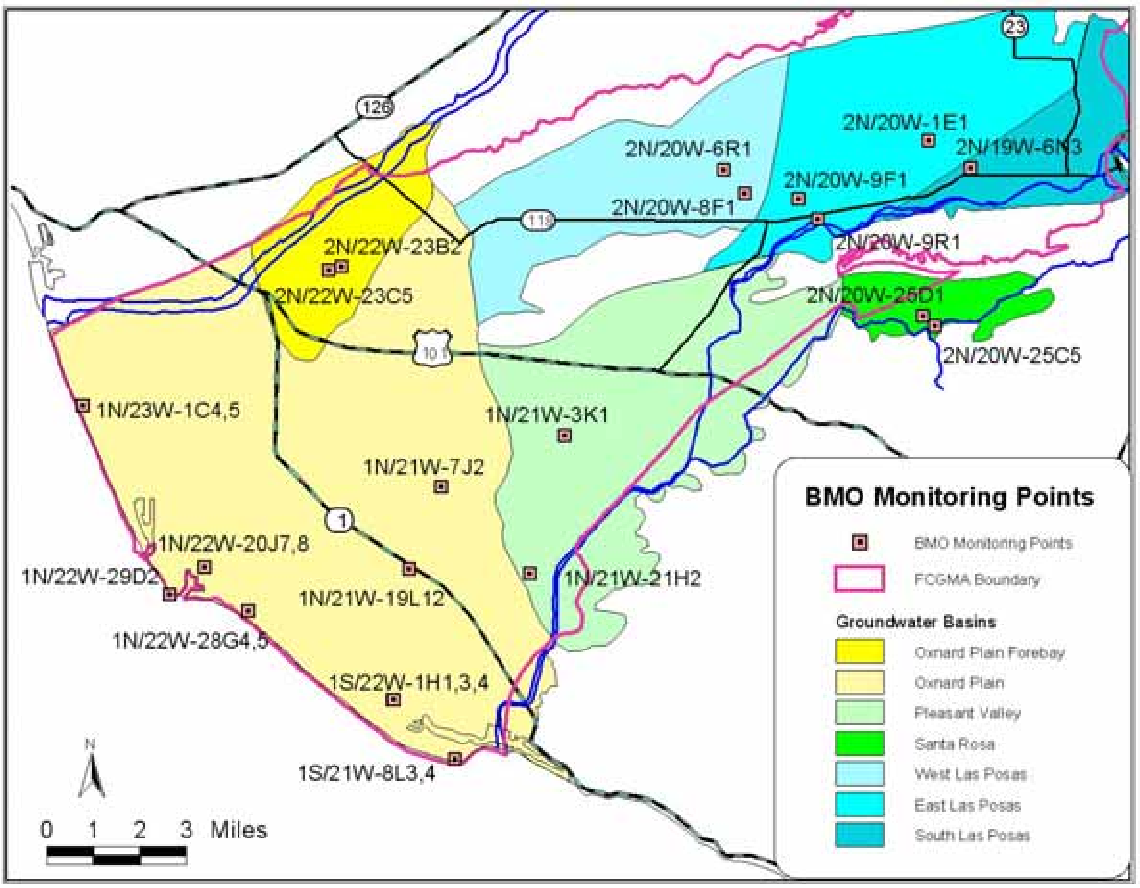


Figure 25. Wells used as monitoring points for Basin Management Objectives.

The pressure differential exerted on the fresh water aquifer depends upon the ocean depth where the aquifer is truncated along the canyon wall – there is the equivalent of 2.5 ft of head (pressure) exerted for every 100 ft of ocean depth. Therefore, an aquifer that is exposed on a submarine canyon wall at 200 ft ocean depth has 5 ft of head exerted on the aquifer by the more-dense seawater. To prevent seawater from intruding from the canyon wall and flowing through the aquifer to the coastline, coastal groundwater elevations must be, on average, at least as high as the head exerted by seawater. Thus, for the example given above, groundwater elevations in monitoring wells at the coastline must average at least 5 ft above sea level to prevent seawater intrusion. The greater ocean depth where the aquifer is exposed to seawater, the higher the average groundwater elevation required to prevent seawater intrusion.

A set of wells was selected to establish the BMOs for the Oxnard Plain basin (Figure 25). Many of these are coastal monitoring wells, completed at different aquifer depths within the Upper (Table 1) and Lower Aquifer Systems (Table 2). There are also several inland wells to detect if a new pumping depression forms in the UAS and if the existing pumping depression in the LAS dissipates. Coastal groundwater elevation objectives were determined using the groundwater elevation and water quality criteria in the preceding paragraph. Inland groundwater elevation objectives were determined such that there is a slight groundwater gradient from the inland areas to the coastline, thereby preventing further landward migration of the existing saline intrusion. The tables list the management objectives for each of the well completions.

The Ventura Regional Groundwater Model suggests that if these groundwater levels are maintained for an adequate period of time, additional saline intrusion will likely be minimized. Water quality objectives for chloride at these wells are also listed in the tables. These objectives follow the Regional Water Quality Control Board's Basin Plan Objective of 150 mg/L for chloride.

Well	*BMO Groundwater Level (msl)*	*Current Level (msl)*[*]	*BMO Chloride (mg/L)*	*Current Chloride (mg/L)*
1N/23W-1C5 (CM3-145, 120-145)	Average 3'	9.2'	<150	41
1N/22W-20J8 (A1-195, 155-195)	Average 4'	14.6'	<150	177
1N/22W-20J7 (A1-320, 280-320)	Average 8'	15.5'	<150	81
1N/22W-28G5 (CM4-200, 180-200)	Average 5'	9.0'	<150	237
1N/22W-28G4 (CM4-275, 255-275)	Average 7'	8.4'	<150	6,536
1N/21W-19L12 (SCE-220, 200-220)	Average 5'	11.3'	<150	67
1S/22W-1H4 (CM6-200, 180-200)	Average 5'	1.8'	<150	4,089
1S/22W-1H3 (CM6-330, 310-330)	Average 8'	-12.5'	<150	1,630
1S/21W-8L4 (CM1A-220, 200-220)	Average 5'	-4.9'	<150	16,917

Table 1. Basin Management Objectives for Upper Aquifer System wells in the Oxnard Plain basin. Well name and perforation depths follow State Well Number.

Well	*BMO Groundwater Level (msl)*	*Current Level (msl)**	*BMO Chloride (mg/L)*	*Current Chloride (mg/L)*
1N/23W-1C4 (CM3-695, 630-695)	Average 17'	15.4'	<150	36
1N/22W-29D2 (CM2-760, 720-760)	Average 19'	0.2'	<150	9,783
1S/22W-1H1 (CM6-550, 490-550)	Average 13'	-33.3'	<150	3,512
1S/21W-8L3 (CM1A-565, 525-565)	Average 14'	-42.3'	<150	4,161
1N/21W-7J2 (PTP #1, 590-1280)	Average 20'	-52.0'	<150	42

Table 2. Basin Management Objectives for Lower Aquifer System wells in the Oxnard Plain basin. Well name and perforation depths follow State Well Number.

6.1.2 Pleasant Valley Basin

In the Pleasant Valley basin, groundwater elevation objectives were calculated to be slightly higher than coastal objectives to prevent landward migration of existing saline intrusion, and to

[*] Groundwater levels are average for last 10 years; chemical concentrations are average for last 3 years.

minimize vertical groundwater gradients that pull salts from encasing marine clays, from surrounding older marine and volcanic rocks, or from deeper waters within the oil fields of the basin. An additional BMO is to maintain chloride concentrations at or below the Regional Water Quality Control Board's Basin Plan Objective of 150 mg/L. These objectives are indicated in Table 3.

Well	BMO Groundwater Level (msl)	Current Level (msl)*	BMO Chloride (mg/L)	Current Chloride (mg/L)
1N/21W-3K1 (PV #4, 403-1433)	Average 20'	-47.2'	<150	107
1N/21W-21H2 (PV #10, 503-863)	Average 20'	-51.9'	<150	93

Table 3. Basin Management Objectives in the Pleasant Valley basin. Well name and perforation depths follow State Well Number.

6.1.3 Oxnard Plain Forebay Basin

In the Oxnard Plain Forebay basin, nitrate concentrations above drinking water standards have historically been a recurring problem. BMOs in the Forebay basin focus on protection of public drinking water wells (nitrate and TDS) and irrigation suitability (TDS). The management objectives are chosen for wells in the Oxnard-Hueneme wellfield (operated by UWCD) because this is the largest potable water system in the Forebay. The management objectives will maintain nitrate concentrations at one-half or less of the Maximum Contaminant Level for drinking water (45 mg/L of NO3 which is a primary drinking-water standard); at concentrations higher than the BMO of 22.5 mg/L, water purveyors must increase monitoring and reporting to the California Department of Health Services. The TDS objective is set at the Regional Board's Basin Plan Objective of 1,200 mg/L. These BMOs are set at two representative pumping wells (Figure 25) in the O-H Wellfield (Table 4).

Well	BMO Nitrate (as NO_3) (mg/L)	Current Nitrate (mg/L)*	BMO TDS (mg/L)	Current TDS (mg/L)
2N/22W-23B2 (135-277)	<22.5	13	<1200	1044
2N/22W-23C5 (140-310)	<22.5	8	<1200	1010

Table 4. Basin Management Objectives for the Oxnard Plain Forebay basin. Perforation depths follow State Well Number.

6.1.4 Las Posas Basins

In the South and East Las Posas basins, BMOs cannot be linked directly to observed groundwater levels, because the Calleguas MWD aquifer storage project (in-lieu deliveries and direct injection into the aquifer) creates artificially high groundwater levels that are not indicative of the state of the basin. Instead, the proposed East Las Posas Basin Management Plan (Appendix C) contains a method to use groundwater levels along with a computerized groundwater model to monitor the health of the basins.

The recharge mound that is moving northward from the Arroyo Las Posas (Bachman, 2002) has mobilized salts from the shallow aquifer (primarily located along the Arroyo) vertically downward into the Lower Aquifer System and then north into the main portion of the basin. This

* Groundwater levels are average for last 10 years; chemical concentrations are average for last 3 years.

subsurface movement of groundwater occurs because the head (pressure) in the LAS are lower than in the UAS. Therefore, an appropriate BMO for the East and West Las Posas basins is to maintain a chloride concentration that is suitable for agricultural irrigation use (this concentration is well below the standard for drinking water).

Monitoring points for these BMO chloride concentrations (Figure 25) were selected both in the degraded southern portion of the basin, as well as in areas unaffected by the migrating salts. The East and West Las Posas basins' objective for the chlorides is set at 100 mg/L to protect salt-sensitive crops such as avocados and berries (Table 5). It should be noted that salt concentrations, and especially chloride, are already high within the South Las Posas basin. This chloride is caused by groundwater at historically high elevations apparently dissolving salts from sediments that were historically unsaturated (see section 5.1.3 *High Salinity Associated with High Groundwater Levels*). Specific management strategies to address the South Las Posas basin are discussed later in this Plan. The BMOs for chloride and TDS in the South Las Posas basin are set at the average concentration of the surface water in Arroyo Las Posas, which is the concentration that would likely be attained when salts dissolved from sediments are either removed or have migrated elsewhere, and the groundwater then reflects the chemistry of its primary recharge source.

Well	BMO Chloride (mg/L)	Current Chloride (mg/L)§	BMO TDS (mg/L)	Current TDS (mg/L)
2N/20W-9F1 (906-1290)(ELP)	<100	164	<500	1,196
2N/20W-9R1 (456-724)(ELP)	<100	187	<500	1,330
2N/20W-1E1 (567-907)(ELP)	<100	28	<500	638
2N/20W-6R1 (1090-1512)(WLP)	<100	12	<600	520
2N/20W-8F1 (752-1406)(WLP)	<100	34	<600	410
2N/19W-6N3 (101-121)(SLP)	<160	150	<1500	1,500

Table 5. Basin Management Objectives for the Las Posas basins. Perforation depths and basin identifier follow State Well Number.

There are also specific water quality criteria for water injected into the East Las Posas basin as part of the Las Posas Basin ASR project. These criteria are included in a letter from the FCGMA to Calleguas MWD dated July 12, 1994 that approved the project as an injection/extraction facility. These criteria include: sodium absorption ratio 1-4 meq/L, TDS 100-800 mg/L, electrical conductivity not to exceed 1100 uMHO, chloride not to exceed 120 mg/L, boron not to exceed 1 mg/L, and nitrate (presumably as NO3) less than 45 mg/L.

6.1.5 Santa Rosa Basin

Basin Management Objectives for the Santa Rosa basin follow the Regional Board's Basin Plan Objectives (Table 6).

---

§ Groundwater levels are average for last 10 years, chemical concentrations are average for last 3 years.

Well	BMO Nitrate (mg/L)	Current Nitrate (mg/L)*	BMO Chloride (mg/L)	Current Chloride (mg/L)
2N/20W-25C5 (Unknown)	<45	116	<150	145
2N/20W-25D1 (UAS)	<45	60	<150	78

Table 6. Basin Management Objectives for the Santa Rosa basin. Aquifer designation (if known) follows State Well Number.

6.2 ASSESSMENT OF BASIN MANAGEMENT OBJECTIVES

The parameters for the proposed Basin Management Objectives (BMOs) are currently monitored on a regular frequency throughout the FCGMA, primarily by the VCWPD and UWCD. Along the coastline of the southern portion of the Oxnard Plain basin, BMOs are being met only in a portion of the Upper Aquifer System (see description and discussion of the Oxnard Plain basin in section 3.0 *Groundwater Basins and Hydrogeology*). Within the Lower Aquifer System, BMOs are significantly different than observed measurements. Groundwater levels are well below sea level both near the coastline and in a wide trough that extends into the Pleasant Valley basin beneath the City of Camarillo.

The Ventura Regional Groundwater Model was used to determine the effectiveness of current and future management strategies in meeting BMOs for groundwater levels. These results are reported under each management strategy and are summarized in Table 8 within the sections on management strategies. The model results were compared to the groundwater level goals set in the BMOs for each strategy that was amenable to evaluation by the model. For instance, strategies that involve shifting the place or amount of recharge and/or pumping can be effectively simulated using the model. Strategies that deal exclusively with water quality, such as reductions in nitrate sources, are not amendable to evaluation using the groundwater flow model.

When current management strategies are applied in the model, BMOs for groundwater levels are met or exceeded in 51% of the quarterly time-steps during the 55-year model period for the Upper Aquifer System (meaning that about half of the time groundwater levels are at or above the BMO values and half the time they are below) and only 5% of the time for the Lower Aquifer System. Successful management strategies are those where groundwater levels meet or exceed the BMOs at least half the time – meeting BMOs all the time is a more conservative approach, but requires much larger and more expensive strategies and does not take into account the natural climatic variations in groundwater levels that occurred even before the basin was pumped extensively. When coastal groundwater elevations are below the BMOs during dry periods, seawater could be pulled into the aquifers, but would then be pushed out during wet periods as groundwater levels rose above the BMOs. This has been the experience in the Upper Aquifer near Port Hueneme, where seawater moved inland and then receded with climatic variations in groundwater elevations below and above the BMOs for that area.

BMOs for LAS groundwater elevations are not being met in the Pleasant Valley basin because of this wide trough of depressed groundwater elevations (see map and discussion in section 3.0 *Groundwater Basins and Hydrogeology*). BMOs for chloride concentrations are not currently being met in all portions of the basin, with chlorides increasing in several wells. A study conducted by UWCD (see following section) indicate some of these chlorides might be pulled from depth with "oil-field production water"[**] that underlies the fresh-water bearing aquifers in the basin (Izbicki et al, 2005). Chloride concentrations are being carefully monitored in the Pleasant Valley basin.

In the Oxnard Plain Forebay basin, BMOs are being met most of the time. However, nitrate concentrations in individual wells in the Oxnard-Hueneme wellfield have periodically been at or above the drinking water standard during drought. Currently, these high nitrates have been evident only during the driest portions of the year when pumping water elevations were at their maximum depth. Both fertilizers from overlying agriculture operations and numerous individual septic tanks are likely contributors to the recurring high nitrate levels in the Forebay, as discussed in the following section. Nitrate problems continue to plague the Santa Rosa basin as well. The high nitrate concentrations in the Santa Rosa basin are also believed to be caused by excessive fertilizer use and numerous individual septic systems.

Two emerging processes could significantly improve source control of nitrate within the FCGMA. Ventura County is in the process of eliminating hundreds of concentrated leach-line septic systems located in the El Rio area of the southern portion of the Oxnard Plain Forebay basin and the northern Oxnard Plain basin; the homes will be connected instead to the adjacent City of Oxnard wastewater system. In addition, the Conditional Discharge Waiver for Irrigated Lands is being put into effect in 2005-2006 by the Los Angeles Regional Water Quality Control Board. This process, with sub-watershed sampling of runoff from agricultural lands, will likely decrease the loading of nitrates from fertilizer through Best Management Practices and education. By 2010, the required monitoring will likely extend to agricultural waters that are percolating to groundwater, in addition to the current emphasis on surface waters.

In the East Las Posas basin, chloride concentrations are higher than the basin management objective in the two wells closest to the Arroyo Las Posas (wells 9F1 and 9R1, Figure 25). Chloride concentrations as high as 273 mg/L have been detected in these wells. Farther into the main portion of the basin, well 1E1 has chloride concentrations of less than 30 mg/L, well below the BMO. In the West Las Posas basin, chloride concentrations remain below the BMO largely because the fault that separates the West and East Las Posas basins appears to be an effective barrier to groundwater flow and the poor-quality water in the East Las Posas basin does not flow into the western basin. Of concern, however, is the recent transient occurrence of higher chlorides in two wells just to the west of the fault. It is not yet known if this is the beginning of wider-spread degradation or if this is caused by periodic overtopping of the fault by poor quality waters in the shallow aquifer along the Arroyo Las Posas.

7.0 YIELD OF THE GROUNDWATER BASINS

7.1 ORIGINAL FCGMA CALCULATION

The approximate yield of all basins within the FCGMA was calculated for the original management plan as approximately 120,000 AFY. This yield was based on a water budget for the year 1980, with estimates of the water balance for every fifth year to 2010. In the year 2010, there were estimated to be extraction rates 25% higher than recharge rates. This calculation is

[**] Izbicki compared the isotopic composition of the sampled groundwater with that of water produced with the oil that was pumped from nearby shallow oil wells.

the origin of the 25% pumping reduction required by the FCGMA. The potential inaccuracies in the assumptions that went into the original balance calculation were not discussed in the previous Management Plan, but they are likely to be relatively high (e.g., Bachman et al, 2005). Note that this yield is not basin-specific, which is discussed in more detail below.

7.2 DEFINITION OF BASIN YIELD

The yield of a basin is the average quantity of water that can be extracted from an aquifer or groundwater basin over a period of time without causing undesirable results. Undesirable results include permanently lowered groundwater levels, subsidence, or degradation of water quality in the aquifer. A basin is in overdraft if the amount of water pumped from the basin exceeds the yield of the basin over a period of time. This does not mean that the same amount of water must be pumped each year – pumping in individual years may vary above or below the yield of the basin during drought or wet years, or as part of basin management plans. If water management in the basin changes, the yield of the basin may change.

The term "safe yield" is often used in judicial proceedings for basin yield; it is determined by technical professionals and subsequently interpreted by courts to define the legal rights to extract groundwater in a basin (further discussion in Bachman et al, 2005). Outside of judicial proceedings, terms such as "perennial yield" are commonly used for basin yield. For the purpose of this Management Plan, the term "yield" is synonymous with "perennial yield" which follows the definition in the previous paragraph.

7.3 METHOD OF CALCULATING BASIN YIELD

To evaluate whether falling groundwater levels are likely to cause an undesirable result (i.e., whether the basin is presently in overdraft), a basin's water levels are evaluated over at least one complete hydrologic cycle to establish a trend. Since hydrologic conditions vary throughout each year and over long periods of time spanning multiple years, conditions must be analyzed over a long period (generally several decades) to accurately determine if the yield has been exceeded such that overdraft is present. If the trend suggests a continual drop in water levels over time, even after wet year conditions, then undesirable results are likely to eventually occur and the basin is considered to be in a state of overdraft.

Methods to determine basin yield include (e.g., Bachman et al, 2005):

- Hydrologic balance,
- Change in groundwater levels over an average hydrologic base period,
- Zero net groundwater level fluctuation,
- The correlation between groundwater levels and extractions,
- Change of storage vs. extractions,
- Calculation of groundwater inflow,
- Groundwater modeling,
- Annual retained inflow and change in groundwater levels,
- Pumping trough in a coastal aquifer (basin yield is exceeded if pumping trough at the ocean creates conditions for seawater intrusion).

The yield calculation for the 1985 FCGMA Management Plan used the hydrologic balance method – summing up all the water inputs and outputs to determine how much could be extracted from the basins. The calculation was not done over a period of wet and dry years, which is the current standard. The basin yield for this Management Plan was calculated using the groundwater modeling method. This method integrates aspects of some of the other methods:

- A hydrologic balance is calculated in the model;
- One of the model outputs is a change in groundwater levels over an average hydrologic base period; and
- A pumping trough in a coastal aquifer is one of the criteria to determine if the basin yield has been exceeded.

The groundwater model technique is more rigorous than the 1985 hydrologic balance calculation because the calculation of a water budget depends upon inputs and outputs (Table 7) to the groundwater basins which can be difficult to estimate independently. The groundwater model also has similar inputs and outputs, but the groundwater model is calibrated to match actual measured groundwater levels over a long period of wet and dry years. This calibration of the groundwater model lessens some of the potential errors in a water budget calculation.

Model Parameter	Input	Output
Aquifer geometry	Yes	
Recharge, discharge areas	Yes	
Aquifer properties (e.g., transmissivity, storage coefficient)	Yes	
Boundary conditions at edge of model	Yes	
Faults	Yes	
Rainfall percolation	Yes	
Streamflow	Yes	
Recharge from adjacent bedrock	Yes	
Irrigation return flow	Yes	
Artificial recharge	Yes	
Pumping	Yes	
Groundwater elevations	For calibration	Yes
Groundwater flow from one area to another (horizontal & vertical)		Yes

Table 7. Inputs and outputs from groundwater flow model (Ventura Regional Groundwater Model).

The groundwater model used was constructed by the U.S. Geological Survey as part of their RASA study (Hanson et al, 2003), which has since been updated and upgraded by UWCD. The groundwater model is described in more detail in Appendix B. The model was also used to test the efficacy of various management strategies. The base period used for the model runs was 1944 to 1998, which encompasses several wet and dry cycles; this period was also used as a base period in the Santa Paula basin and Santa Maria basin adjudications during the last decade. The base period is only used in the model to simulate the natural hydrology over the 55-year period – modern and future man-made inputs and outputs such as water facilities, pumping, and artificial recharge are added to the model to determine both the current state of the basin and the future state of the basin with new management strategies applied.

There is little doubt that the coastal basins within the FCGMA have exceeded their yield and been in overdraft for several decades. The over-arching undesirable result of lowered groundwater levels has been seawater and other saline intrusion. A key aspect of the modeling was to determine the basin yield such that these undesirable results caused by lowered groundwater levels were eliminated.

Basins within the FCGMA that do not abut the coastline and do not themselves have saline intrusion cannot be evaluated directly for this undesirable result. The 1985 FCGMA Management Plan handled this by treating all the basins of the FCGMA as a common pool – an action in one of the basins would also affect the other basins – so pumping in one basin affects groundwater levels in adjacent basins. There is ample evidence that this proposition continues to be correct, with potentially two exceptions (East and South Las Posas basins). The Oxnard Plain Forebay, Pleasant Valley, West Las Posas, and Santa Rosa basins are all hydrologically connected to the coastal basins, evidenced by the continuity of groundwater elevation contours across their boundaries. The East and South Las Posas basins appear to be hydrologically disconnected within the subsurface from the other basins, separated from adjacent basins by either the north-south fault between the East and West Las Posas basins or a structural discontinuity between the basins and the northern Pleasant Valley basin at LAS depths. Thus, in this Management Plan, the East and South Las Posas basins are combined in determining basin yield and the remaining basins are combined for the same purpose. An example of this combination is the Oxnard Plain Forebay basin – although the basin regularly fills during wet periods, it is so directly connected to the Oxnard Plain basin (there are no hydrologic barriers preventing flow between the basins) that it is not considered separately in determining basin yield.

To determine the yield of the two sets of basins, groundwater levels calculated by the groundwater model for the 55-year forward model period were then compared to the section 6.0 *Basin Management Objectives* in the various basins to determine how close the modeled groundwater levels were to the objective groundwater levels. Because the model simulates conditions over several wet and dry climatic cycles, average modeled groundwater levels were compared to the objectives. The following section summarizes the results of these comparisons.

The basin yield calculation was accomplished in several steps:

1) The groundwater model was run in its 55-year forward model configuration (see Appendix B) with current management strategies included. If modeled groundwater levels were at or higher than Basin Management Objectives for more than half of the time, then undesirable effects such as seawater intrusion were less likely to occur and the basins were considered to be operated within their yield. If not, then the basins were considered to be operating in excess of their yield.

2) Groundwater extractions in the basins were either increased or decreased by stepwise amounts to determine the amount of pumping that would meet the criteria of modeled groundwater levels being at or above BMOs for more than half of the time, but not exceed, BMOs. Extraction were modified in two ways: a) changes were made proportionately to all wells in the basins within the FCGMA, and b) changes were made only in portions of the basins that were tailored to prevent undesirable effects (e.g., extractions were reduced in the south Oxnard Plain and Pleasant Valley only).

3) As an additional calculation, all of the management strategies in this Management Plan were combined in one model scenario to simulate whether Basin Management Objectives can be met when all the strategies were applied – in other words, can these objectives be met with the tools that may be available.

7.4 BASIN YIELD

When current strategies were applied in the Base Case groundwater model run (see Appendix B), groundwater levels in the Upper Aquifer System met or exceeded BMOs 51% of the time and in the Lower Aquifer System 5% of the time. These results are consistent with observed groundwater conditions today, where groundwater levels are close to BMOs in the Upper Aquifer (and seawater is largely being held back) and significantly below BMOs in the Lower Aquifer. Thus, both the model results and observed groundwater levels indicate that the basins within the FCGMA are not being operated within their yield under the current pumping patterns and management strategies – lowered groundwater levels create undesirable effects such as saline intrusion.

To determine basin yield, pumping was then reduced step-wise in the forward model until BMOs were met at least half the time during the model simulation. As indicated above, two methods of pumping reductions were used – GMA-wide and targeted only to the south Oxnard Plain and Pleasant Valley basins. The results of these model runs are shown in Figure 26.

Figure 26 indicates that when progressively greater pumping reductions are applied to all wells within the FCGMA, Lower Aquifer BMOs are attained at least 50% of the time when FCGMA pumping is reduced to about 65,000 AFY – about half of current average pumping. When the reductions are limited to the south Oxnard Plain and Pleasant Valley basins, overall FCGMA pumping is reduced to about 100,000 AFY to attain the same Lower Aquifer BMO goals. Because the significant lowering of groundwater levels has occurred in the south Oxnard Plain and Pleasant Valley areas, it is appropriate that this is where pumping reductions should occur, as they have through historic in-lieu water deliveries. Thus, 100,000 AFY appears to be an appropriate number for basin yield.

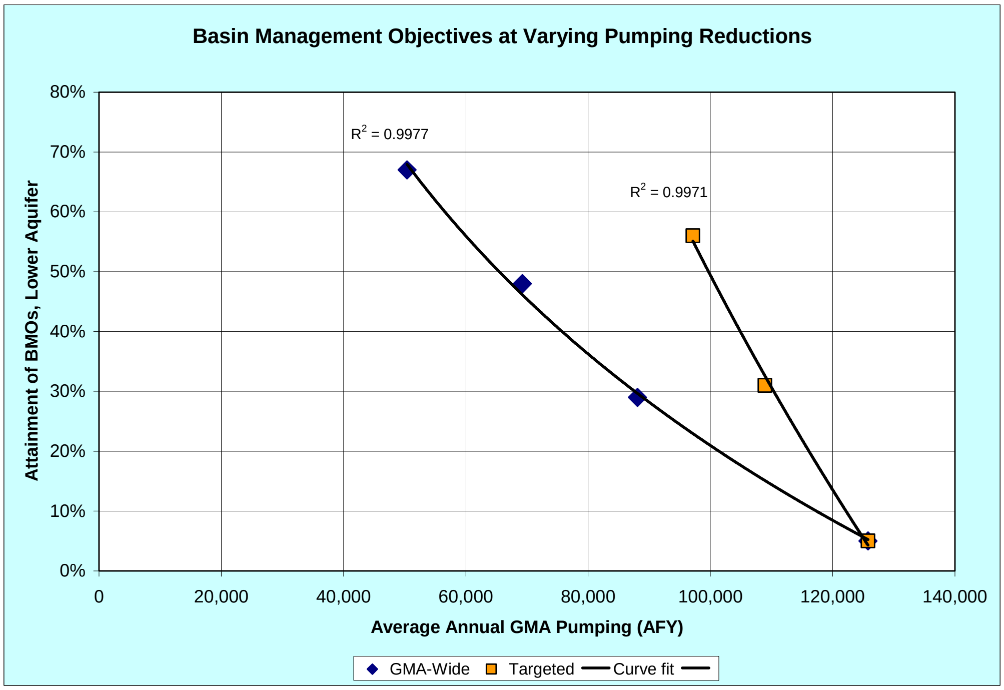


Figure 26. Groundwater model results from progressively reducing FCGMA pumping both agency-wide (diamond symbol) and targeted to the south Oxnard Plain and Pleasant Valley basins (square symbol). Results are indicated as percent of time that BMOs are met or exceeded in the Lower Aquifer System. R^2 values are indicated for the two curve fits.

There are three caveats to this calculation of basin yield:

1) Overall pumping in the south Oxnard Plain and Pleasant Valley areas was reduced by about 25,000 AFY (an 85% reduction). There are several approaches to achieve this reduction, with replacing the pumping with in-lieu deliveries being the primary historic method that is also favored in the management strategies discussed in this Plan.

2) The yield of the basins is not a forever-fixed number, but depends upon the projects in the basin – increasing the amount of recharge in the basins also increases the yield of the basins. Therefore, the yield of the basins must be recalculated periodically as new projects become operational and conjunctive use is increased.

3) When Lower Aquifer BMOs are attained 50% of the time, there should be no net movement of seawater within the aquifers. However, during dry periods there would be onshore gradients and during wet periods there would be offshore gradients. Thus, seawater may move landward during the dry periods and be pushed back during wet periods (which has been evident over the past 15 years at coastal Port Hueneme). To create conditions such that seawater could never move landward, the Lower Aquifer goals would have to be met nearly 100% of the time – an unrealistic goal that would require very large pumping reductions and create conditions where large quantities of fresh water were flowing to the ocean almost all the time. The 50% attainment of BMOs should be considered as an initial target level, but should be revisited as that goal is approached to ensure that it is sufficiently protective of the aquifers. If water quality problems continue as the 50% attainment level is approached, an increase in the attainment level should then be considered. Thus, the basin yield of 100,000 AFY that is tied to the 50% attainment level may have to be adjusted in the future.

An additional basin yield task was to apply all the future management strategies into one simulation of the model to determine whether Basin Management Objectives could be met if these strategies were in place. After applying the management strategies discussed in section 9.0 *Management Strategies Under Development* and section 10.0 *Potential Future Management Strategies*, the groundwater modeling indicates that Upper Aquifer BMOs could be met 67% of the time and Lower Aquifer BMOs could be met 76% of the time. Thus, application of the management strategies in this Plan apparently can solve the overdraft within the FCGMA.

8.0 CURRENT GROUNDWATER MANAGEMENT STRATEGIES

This Plan evaluated three types of management strategies for effectiveness: 1) currently implemented management strategies; 2) strategies under development where some action has already been taken to design and implement those strategies; and 3) potential future management strategies. Current strategies were evaluated by measuring their effect on changing groundwater levels and improving groundwater quality. Proposed and future strategies were evaluated using the Ventura County Regional Groundwater Model (an empirical computer simulation of groundwater flow described in Appendix B).

Several management strategies were adopted as part of the original 1985 FCGMA Management Plan. In addition, several other strategies were also implemented in the ensuing period since 1985. The previously-adopted 1985 FCGMA management strategies are discussed first, followed by the additional strategies. The effectiveness of these management strategies is then evaluated in the following discussion.

8.1 DESCRIPTION OF 1985 FCGMA MANAGEMENT PLAN STRATEGIES

The original 1985 FCGMA Management Plan specified several management strategies that would be implemented. These included the following general strategies.

8.1.1 Limitation of Groundwater Extractions

The most visible of the FCGMA strategies was the phased reduction in pumping within the FCGMA, implemented under FCGMA Ordinance No. 5 (now Chapter 5 within Ordinance No. 8.1). This strategy called for a 25% pumping reduction over a 20-year period via phased 5% incremental cutbacks to Historical Allocations every 5 years. As part of this strategy, pumping allocations, conservation credits, and agricultural irrigation efficiency allowances were implemented. To allow inherent flexibility, the Ordinance provides for Historical Allocation adjustments of no more than two acre feet per acre when land use changes from farming to municipal/industrial. A Baseline Allocation of one acre foot per acre was established for lands without allocations or lands that were developed after the baseline period ended in 1989 and were dependent upon groundwater. In addition, an Efficiency Allocation that allows farmers sufficient allocation to grow different crops as long as they remain at least 80% efficient (less than 20% of irrigation water runs off, leaches, or goes to deep percolation). Baseline and Efficiency allocations are exempt from the mandatory 25% reductions. To discourage overpumping, the FCGMA Ordinance imposes an extraction surcharge on all water pumped in excess of the annual allocation. The penalty initially ranged from $50/AF to $200/AF under a four-tiered system; however, that system was modified in favor of a single flat rate that was adjusted upward to $725/AF.

Ordinance No. 5, now part of Ordinance No. 8.1, also has a provision for establishing Conservation Credits by extracting less groundwater than the Historical Allocation. Conservation Credits can be used to avoid paying penalties when extractions exceed the allocation. A second type of credit, Injection or Storage, may be established and applied to future extractions when foreign water is injected or percolated into the aquifer. Conservation credits are allowed to accumulate with no restrictions, allowing some pumpers to accumulate credits for tens of thousands of acre-feet of water.

The required phased 5% reductions occurred in 1992, 1995, and 2000 for a current reduction of 15% of allocation for pumpers using their Historical Allocation. The planned additional 5% reduction for 2005 has been delayed per a request from M&I well owners who have asked for a re-evaluation of the effectiveness of such reductions as part of formulating this Management Plan.

8.1.2 Encourage Both Wastewater Reclamation and Water Conservation

The Ventura County Planning Department prepared a “Water Conservation Management Plan” which recommended various voluntary measures that could be employed to conserve water. Many farmers, individual households, and cities have adopted voluntary agricultural and urban water conservation programs. For several years, in the late 1980s and early 1990s, the County Planning Department designated Planner positions as “Water Conservation Coordinators.” This program no longer has funding, but the water conservation program created material that continues to be distributed to schools and the public.

A Countywide Wastewater Reuse Study, prepared in 1981, identified wastewater reuse opportunities in the Las Posas Valley from either the Simi Valley Wastewater Treatment Plant or the Moorpark Wastewater Treatment Plant, and identified an opportunity to use recycled wastewater from the Thousand Oaks/Hill Canyon Wastewater Treatment Plant for irrigation on the Oxnard Plain. Since that report, the Moorpark Wastewater Treatment plant has upgraded to tertiary disinfection and a portion of the recycled water is supplied for irrigation to nearby golf courses. The Thousand Oaks/Hill Canyon project (now known as the Conejo Creek Diversion project) has been in operation for several years; it is discussed in the following section. In addition, the City of Oxnard's proposed recycled water project is discussed in section 9.1 GREAT Project (Recycled Water).

8.1.3 Operation of the Oxnard Plain Seawater Intrusion Abatement Project (UWCD's Pumping Trough Pipeline, Lower Aquifer System Wells, Freeman Diversion) –

The Pumping Trough Pipeline (PTP) was constructed in 1986 to convey diverted Santa Clara River water to agricultural pumpers on the Oxnard Plain, thus reducing the amount of groundwater extractions in areas susceptible to seawater intrusion (Figure 27). When river water is not available, five Lower Aquifer System wells pump water into the pipeline. The Freeman Diversion (1991), which replaced the former use of temporary diversion dikes in the Santa Clara River with a permanent concrete structure, now allows for diversion of river storm flows throughout the winter rainy season. As a side benefit, the Freeman Diversion helped stabilize the riverbed after years of degradation caused by in-stream gravel mining. The permanent Freeman Diversion increased the yield of the Seawater Intrusion Control Project by about 6,000 AFY over the previous means of temporary diversion.

8.1.4 Operating Criteria for the Oxnard Plain –

The combination of FCGMA policies and water conservation facilities have effectively moved pumping away from the coastline and from the Upper Aquifer System to the Lower Aquifer System. The switch in aquifer pumping is discussed in the next FCGMA strategy. The effectiveness of these criteria is discussed in section 8.3 Effectiveness To-Date of Current Management Strategies.

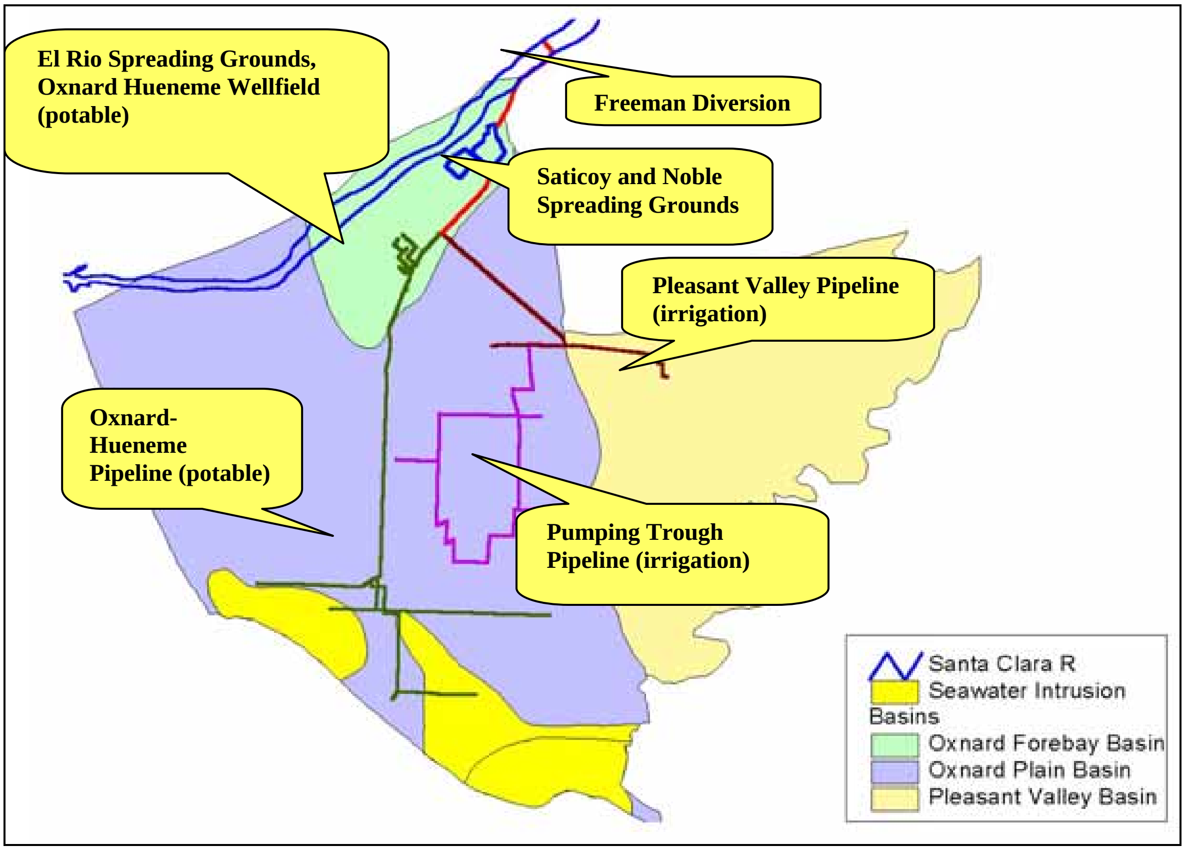


Figure 27. Elements of the Seawater Intrusion Control Project on the Oxnard Plain.

8.1.5 Construction/Modification Restrictions on Upper Aquifer System Water Wells –

In areas where they could cause overdraft or seawater intrusion in the Oxnard Plain basin, the County adopted a well ordinance that prohibited new wells in the Upper Aquifer System in the Oxnard Plain basin, instead requiring new and replacement wells to be drilled in the Lower Aquifer System. The effectiveness of this strategy is discussed in section 8.3 *Effectiveness To-Date of Current Management Strategies*.

This policy has now been shifted. A new policy for areas where pumping could cause overdraft or seawater intrusion in the Oxnard Plain basin (especially in what are called Sealing Zones 1 and 2 where multiple aquifer layers exist) was adopted by the County. This new well ordinance, adopted in 1998, prohibited new wells in the LAS beneath the Oxnard Plain, instead requiring new and replacement wells to be drilled into the more-easily replenished UAS. This shift in pumping was effected by a change in the County Well Ordinance to institute a complete reversal in which aquifers are targeted for production based on findings from the U.S. Geological Survey RASA study and observations from the network of monitoring wells. Since the County Well Ordinance was revised in 1998, only replacement wells or situations with no other water supply option available may tap into the LAS beneath the Oxnard Plain.

8.1.6 Annual Groundwater Monitoring Program

The FCGMA and UWCD participated with the USGS in installing (circa 1990) a series of multiple-completion nested monitoring wells along coastal areas of the Oxnard Plain basin and in a few inland areas. These wells allow measurement of groundwater levels and sampling of water quality at two to six discrete aquifer depths at each well site. These wells, in addition to a wide range of productions wells, are now being monitored at regular intervals by VCWPD and UWCD. The VCWPD findings are entered into a database and published as supporting data in various reports on water quality, groundwater basins, or special subject or area studies. UWCD enters its monitoring data into a database that is then augmented by monitoring data from VCWPD and California Department of Health Services (public supply wells). UWCD conducts an annual evaluation of all the monitoring results in its database and prepares an annual report that is available on UWCD's website (www.unitedwater.org).

8.1.7 Contingency Plan for LAS Seawater Intrusion

Although it was hoped that such a plan would never be needed, the FCGMA staff developed an as-yet-unfinished and informal contingency plan that consists of a list of possible measures that could be instituted to address intrusion of seawater into the LAS. The list items were only to be offered to the FCGMA Board as possible countermeasures in the event of a severe water quality decline in a significant number of LAS wells. This list included suggestions such as managing the intruded basin in a separate management scheme, further reductions in LAS well Historical Allocations, possible groundwater use restrictions by maximum volume per acre served (in the case of irrigated lands or per resident or dwelling unit in the case of urbanized areas), a complete ban on all future LAS wells regardless of need or circumstance, monetary or other potential incentives to encourage LAS well owners to destroy wells in favor of other possible water sources, and other such means of LAS management.

8.1.8 North (now called East and West) Las Posas Basin Pumping Restrictions

The FCGMA adopted Ordinance No. 4 (now Chapter 4 within Ordinance 8) that prohibits expansion of water use outside the Las Posas Basins and/or the Agency boundary, especially on the sensitive Aquifer Outcrop Zone or Expansion Area. The Aquifer Outcrop Zone is that land or geographic area where the Fox Canyon and/or Grimes Canyon aquifers reach the ground surface and are exposed as outcrops. Ordinance 4 restricts or precludes use of any harmful land uses in this zone (such as impervious surfaces, septic systems, pesticides, fertilizers, or groundwater withdrawals), because this area acts as a direct conduit to the usable aquifer water stored at depth. The Expansion Area was defined as that portion of land from the crest of the hill or 1.5 miles beyond the Agency boundary (northernmost extension of the Aquifer Outcrop) that drains into the Agency. Because groundwater quality protection and prevention of volume exports are the prime subjects of these laws, the Expansion Area was officially designated as an official Sphere of Influence zone by the Ventura LAFCO (Local Area Formation Commission). No wells, no additional agriculture, and only very limited single family home development is allowed in these areas, and only under special restrictions and circumstances.

8.1.9 Monitor FCGMA Groundwater Extractions to Ensure That They Do Not Exceed Adopted Projections for That Basin

The FCGMA requires semi-annual reporting of extractions from pumpers within the Agency as part of the measures instituted within Ordinance No. 5 (now Ordinance No. 8). These data are entered into a database maintained by the FCGMA. Individual operator annual extractions are compared against allowed allocations or irrigation efficiency at the end of each calendar year to determine whether well operators are within their allowed pumping. As discussed under the first strategy on limitations of groundwater pumping, penalties are assessed for overpumping, and credits are posted for conservation or storage.

8.1.10 Implementation of Drilling and Pumping Restrictions

This strategy is discussed as part of several of the strategies above and is supported by the County Well Ordinance and the cooperation of water districts and well owners.

8.1.11 Metering of Groundwater Extractions

As part of the original Ordinance No. 5, extractions must be reported to the FCGMA on a semi-annual basis. Ordinance No. 3 (now Chapter 3 within Ordinance No. 8) required water flow meters to be installed at owners' expense on all groundwater pumps except domestic users on one acre or less. Not all pumpers have installed meters or use their meter readings to report extractions. Resolution 2006-1 requires periodic accuracy calibration of every water flow meter by independent testing agents. This Resolution also tightened requirements and imposed restrictions on well extraction reporting in addition to adding more strict penalties for non-compliance.

8.2 DESCRIPTION OF OTHER CURRENT STRATEGIES

There are several other groundwater management strategies that have been implemented within the FCGMA area that were not foreseen when the original management plan was formulated some 20 years ago. These include:

8.2.1 Fox Canyon Outcrop Expansion Area

A buffer zone ("Expansion Area") along the outcrops of the Fox and Grimes Canyon aquifers, which are adjacent to and outside of the FCGMA boundaries, was established in 1997. This zone was established to protect any land uses on the outcrop or within the Agency that might adversely affect groundwater recharge, groundwater extractions, or water quality.

8.2.2 Noble Spreading Basins

The Noble Spreading Basins (1995), across Los Angeles Avenue opposite UWCD's Saticoy Spreading Grounds, were constructed to store and recharge additional Santa Clara River water diverted at the upstream Freeman Diversion, particularly during wet periods. These relatively shallow basins were reclaimed gravel pits purchased by UWCD and reconfigured as water spreading basins. Water placed in the facility recharges both the Upper Aquifer System and the Lower Aquifer System. The ten-year average for the facility is 6,000 AFY, with individual years varying from 0 AF to 17,800 AF.

8.2.3 Las Posas Basin ASR Project

The FCGMA in 1994 approved Calleguas MWD's Las Posas Basin Aquifer Storage and Recovery (ASR) project as an Injection/Storage Facility. This allowed Calleguas MWD to receive Storage Credits for water recharged as part of the project. Conditions of the approval included registration of the injection/extraction wells, monthly reporting of injection/extraction volumes, water quality requirements for injected water, a limit on the amount of water in storage (300,000 AF), required points of extraction, a limitation to use the stored water only within Ventura County, periodic review of injection/extraction effects, and an agreement to halt operations if any conditions are not met. As of 2006, Calleguas MWD has stored over 60,000

AF of water through in-lieu deliveries to basin pumpers and direct injection. Although most extractions have been for testing and maintenance purposes, full-scale extractions occurred during January 2007 to supply customers during a scheduled maintenance shut-down of the supply line bringing State Water to Calleguas MWD.

8.2.4 Conejo Creek Diversion Project

The Conejo Creek Diversion Project (2002), constructed by Camrosa Water District just south of where Highway 101 crosses Conejo Creek, diverts flows from the creek and delivers the water to Pleasant Valley County Water District to meet local irrigation demands within the overdrafted Pleasant Valley basin. The water diverted from the creek is a combination of natural stream flow and recycled water released into the creek from wastewater treatment plants upstream. This diverted water replaces Lower Aquifer System pumping in the Pleasant Valley basin. The contractual amount of water from the diversion is 3,000 AFY (if available), although an average of 5,300 AFY has been diverted in the first four years of operations. These diversions may increase temporarily, but are likely to decrease over the next 20 years as the recycled water is used elsewhere by Camrosa Water District customers.

8.2.5 Supplemental M&I Water Program

The Supplemental M&I Water Program is operated through the Oxnard-Hueneme (O-H) Pipeline system. The joint UWCD-Calleguas MWD project uses FCGMA credits earned by Pleasant Valley County Water District from the Conejo Creek Diversion Project to supplement O-H water supply. This project effectively shifts Lower Aquifer System pumping in the Pleasant Valley basin to Upper Aquifer System pumping in the Oxnard Plain Forebay basin. The program is capped at 4,000 AFY and is only implemented in years when groundwater levels in the Forebay are sufficiently high to prevent harm to other Forebay pumpers. The program effectively reimburses Calleguas MWD for their investments in the Conejo Creek project, a precedent that may allow similar types of projects in the future.

8.2.6 Saticoy Wellfield

The UWCD Saticoy Wellfield (2005) was constructed adjacent to the UWCD Saticoy Spreading Grounds to pump shallow water from the recharge mound underlying the spreading grounds in wet years and deliver the water to users along United's existing agricultural pipeline system (Pleasant Valley and PTP pipelines). This pumping from the Oxnard Plain Forebay basin decreases the recharge mound, allowing more spreading and groundwater recharge from the basins during wet periods. The water produced by the pumping in the Forebay replaces LAS groundwater pumping along the Pumping Trough Pipeline (PTP) and Pleasant Valley (PV) Pipelines.

8.2.7 Importation of State Water

The County of Ventura holds a State Water allocation of 20,000 AFY administered by the California Department of Water Resources (DWR). This allocation is divided among UWCD, the City of Ventura, Port Hueneme Water Agency (as a sub-allocation of UWCD's portion), and Casitas MWD. UWCD uses its allocation to supplement recharge to the aquifers along the Santa Clara River within Ventura County. UWCD's 3,150 AFY allocation (UWCD's allocation was 5,000 AFY, but the Port Hueneme Water Agency acquired 1,850 AFY of the allocation) is ordered from DWR during normal and dry years for delivery to Lake Piru via stream releases from the DWR-operated Lake Pyramid downstream along Piru Creek. This State Water is then released from Lake Piru as part of UWCD's normal conservation release in the late summer and fall. As this water flows down Piru Creek and the Santa Clara River, a portion of it percolates into the groundwater basins along the river (Piru, Fillmore, and Santa Paula) and a portion reaches the Freeman Diversion for recharge to the Oxnard Plain.

This recharge is not credited by the FCGMA to UWCD directly, but based on many years of study, measurement, and computer modeling, the portion of the DWR purchased water that ultimately reaches the Freeman Diversion is credited as new or foreign water. The credits are placed in a UWCD-held trust fund that may be used in the future to solve common FCGMA management issues that are beneficial to the aquifers within the Agency. The Port Hueneme Water Agency's 1,850 AFY is delivered via Calleguas MWD's conveyance facilities. Except for 2,000 AF imported in 2002, no other portion of the 20,000 AFY entitlement has ever been imported to Ventura County, although annual capital costs continue to be paid to DWR to maintain this Allocation. Additional importation of State Water is discussed in section 10.0 *Potential Future Management Strategies*.

8.2.8 Additional Groundwater Monitoring

As saline intrusion has encroached further inland beneath the south Oxnard Plain, saline waters have moved eastward of the existing monitoring well network in some areas. In 2006, UWCD will install two additional nested monitoring well sites north of Mugu Lagoon, with funds obtained from a Department of Water Resources grant. These monitoring wells will be incorporated into the monitoring network and sampling protocol for the existing dedicated monitoring wells.

8.2.9 Calibration of Groundwater Extraction Meters

Resolution 2006-1 was adopted by the FCGMA Board that will phase-in a flow meter calibration and inspection program over three years. After the phase-in, each meter will be required to be checked at 3-year intervals.

8.3 EFFECTIVENESS TO-DATE OF CURRENT MANAGEMENT STRATEGIES

The management strategies applied over the past 20 years to combat seawater intrusion have resulted in significant changes in water levels and in water quality indicators in the FCGMA aquifers. Conditions in the Upper Aquifer System (UAS) have improved with groundwater elevations increasing to, or exceeding, acceptable levels and chloride-impacted water decreasing in both concentration and geographic extent in most areas. However, water quality conditions in the Lower Aquifer System (LAS) have worsened over this same time period. Specifically, LAS groundwater elevations in the southern portion of the Pleasant Valley Basin and southern Oxnard Plain Basin have decreased and remained well below sea level and salinity has increased in both concentration and geographic extent. This has occurred for two reasons. First, the combined UAS and LAS extraction in this area has exceeded levels the resource can support. Second, policies adding recharge to the UAS and switching pumping from the UAS to the LAS have relieved the stress on the Upper Aquifer but increased the stress on the Lower Aquifer.

The FCGMA policy of reduced pumping has had positive effects in all the aquifers. For pumpers using their Historical Allocation under Ordinance No. 5, there has been a pumping reduction in excess of the 15% currently required by the FCGMA. There have been only isolated incidents of pumping in excess of allocation, reflecting both the general acceptance of the pumping reductions and the stiff monetary penalty for overpumping. For agricultural pumpers using an Irrigation Efficiency calculation, pumping reductions have been even more dramatic. In a study using the FCGMA weather stations to calculate daily crop water demand, Agency-wide irrigation efficiency (measured by less reported water use compared to FCGMA-computed crop water demand) improved by about 30% during the first several years of the FCGMA pumping reductions (UWCD, 2002). The increased efficiency is consistent with the decreased extractions reported to the FCGMA over the last decade (see section 4.0

Groundwater Extractions). Widespread acceptance and installation of drip tape, micro sprinklers, mini sprinklers, leak repairs, computer controlled watering cycles, farm-operated weather stations to assist with irrigation frequency and duration, various ground-based moisture sensors and lysimeters, farmer and irrigation crew education, and a shift away from wasteful furrow irrigation or high volume sprinkler heads, along with reduction of tailwater losses have all contributed to the reduction in groundwater use.

One of the key hydrogeologic findings over the last 10 years indicated that a zone of lower conductivity (such as a fault or some other deformation) extends from the Camarillo Hills to Port Hueneme (aligned with the known location of the Simi-Santa Rosa fault in the Camarillo Hills) limiting the amount of recharge that can flow from the Oxnard Plain Forebay basin into the south Oxnard Plain and Pleasant Valley areas. This zone appears to be limited to the Lower Aquifer System, with no evidence that the lower conductivity zone extends upward into the Upper Aquifer System. In these areas of the LAS, extractions far exceed recharge, resulting in groundwater levels that have fallen to well below sea level from the ocean inland to the City of Camarillo. Three current projects recharge these critically overdrafted areas: diverted Santa Clara River water is delivered via the Pleasant Valley and Pumping Trough pipelines and diverted Conejo Creek water is delivered via the Conejo Creek project. These three projects deliver in-lieu recharge to the south Oxnard Plain and Pleasant Valley basins (the delivered surface water is used for irrigation in-lieu of pumping groundwater).

However, the Pumping Trough Pipeline (PTP) operated by UWCD provides mixed effects in reducing pumping in the Lower Aquifer System. The diverted Santa Clara River supplies delivered to PTP customers in-lieu of pumping groundwater have unambiguous benefits in helping to eliminate the pumping trough in the Upper Aquifer System and helping eliminate overdraft in the Lower Aquifer System. But the PTP project also has five LAS wells that provide irrigation water to customers along the pipeline when there are insufficient supplies in the Santa Clara River available for diversion and delivery. These wells were completed in the LAS because at the time the LAS was in better shape than the UAS. Since the UAS has substantially recovered from overpumping but the LAS has been severely depleted, these five LAS wells are no longer optimally-located; they now pump from the flank of the large pumping depression in the LAS of the south Oxnard Plain and Pleasant Valley basins. Thus, one of the previously-assumed solutions to reduce groundwater extractions within the pumping trough of the UAS has created new problems in the LAS. Some of this LAS pumping for the PTP project is being replaced by UAS pumping from the UWCD Saticoy Wellfield (located in the Oxnard Plain Forebay basin); this strategy should be maximized in the future.

One of the FCGMA strategies historically underutilized is the substitution of recycled water for groundwater pumping. The Conejo Creek project has begun the process of using recycled water which originates in the City of Thousand Oaks. Other recycled projects are not yet operational (e.g., see later discussion of the City of Oxnard's GREAT project).

The Ventura Regional Groundwater Model was used to test the future effectiveness of current projects to reduce the overdraft in the FCGMA basins. This analysis assumes that hydrological conditions of the past 50 years are similar to future conditions, that projects continue to be implemented as designed, and that FCGMA reported pumping is relatively accurate. This modeling indicates that when all current projects that implement the FCGMA Management Plan are operational, there will still be an overdraft in the basins within the Agency. With only current strategies in place, BMOs for groundwater levels would be met 51% of the time in the Upper Aquifer and 5% of the time in the Lower Aquifer (see Appendix B). This analysis is derived from the model Base Case, which uses reported pumping over the past 10 years as the basis for modeled extractions. If actual pumping was higher than reported, then the model would have to be recalibrated to reflect this. A sensitivity analysis was conducted to examine the effect of understated pumping in the model (Appendix B, section A2.2.2 *Sensitivity Analysis – Understatement of Reported Extractions*), which indicated that if agricultural pumping was understated by 15% (caused by poorly-calibrated meters or inaccuracies in other reporting methods), results from the current model could be up to 15 feet too high in the Lower Aquifer (the aquifers would be in worse shape than modeling suggested). If the model was recalibrated to reflect this understatement of pumping, these results would be corrected.

It is clear both from the modeling results and from the observation that BMOs are not being met in many areas, and that additional management strategies and projects must be initiated to alleviate this continued overdraft. The following sections address this need.

9.0 MANAGEMENT STRATEGIES UNDER DEVELOPMENT

There are several projects at various stages of development that will further reduce water supply and water quality problems within the FCGMA. Some of these projects follow the original management strategies of the Agency, whereas others deal with issues not contemplated in the original management plan. The strategies are presented in the order of their impact on the aquifer (high impact strategies are discussed first), with projects under development discussed in this section and future strategies discussed in the following section. The ranking of both strategies under development and future strategies that were amenable to testing with the groundwater model is indicated in Table 8. For strategies that could not be directly evaluated with the groundwater model (because there was no change in the place or amount of recharge or pumping), other ranking factors are discussed with each strategy.

Strategy	*UAS ΔWL*	*Meet UAS BMOs*	*LAS ΔWL*	*Meet LAS BMOs*
Current Strategies		**51%**		**5%**
Barrier Wells	+11’	63%	+46’	48%
GREAT Project	-1’	51%	+38’	36%
Injection River Water	+1’	53%	+7’	11%
Shift Pumping UAS	-1’	50%	+8’	9%
Increase River Diversions	+3’	54%	+3’	8%
Addtl Recharge S Oxnard	+1’	53%	+4’	7%
Continue 25% Reduction	+1’	53%	+2’	7%
Import State Water	+2’	54%	+1’	7%
RiverPark Recharge	<1’	52%	<1’	6%
Shift Pumping NW Oxnard	<1’	51%	<1’	5%
All Strategies	**+15’**	**67%**	**100’**	**76%**

Table 8. Ranked results of groundwater modeling of management strategies amenable to evaluation with the groundwater model. The table indicates the average change in groundwater levels expected in each aquifer <u>at the wells for which there is a BMO</u> for each strategy. The table also indicates the average amount of time that groundwater levels were at or above BMOs for each aquifer (see discussion of this technique in section 6.0*Basin Management Objectives*).

9.1 GREAT PROJECT (RECYCLED WATER)

The GREAT (Groundwater Recovery Enhancement and Treatment) project is ranked highest of the projects under development because of its effectiveness in reducing Lower Aquifer overdraft (see Table 8). However, the most effective portion of the project would occur at 10 to 15 years from now, when all components of the project are scheduled to be in place.

9.1.1 Description

The project is being designed and implemented by the City of Oxnard. The project has three major components: 1) a new regional groundwater desalination facility; 2) a recycled water system to deliver water to M&I non-potable water uses within the City of Oxnard, to deliver water to agricultural users in the Pleasant Valley area, and to inject water as a barrier to seawater intrusion; and 3) conveyance of desalination backwash concentrates through a brine line to either the City's existing ocean outfall or the Ormond Beach area for coastal wetland restoration. Potable water supplies for the City would then be pumped from the Forebay by utilizing FCGMA credits earned from both direct recharge (barrier wells) and in-lieu recharge (M&I non-potable and agricultural deliveries). This Forebay supply could be pumped from existing Oxnard-Hueneme system UAS wells, existing City wells, and/or new City wells. The FCGMA would have to approve recharge and pumping facilities, as well as implement policies discussed later in this section.

The project will be constructed in phases, with project yield ramping up over time from around 5,000 AFY to more than 21,000 AFY. Actual timing of construction will depend upon projected growth in water demand and funding. This project implements the strategy of pumping groundwater from areas of the aquifer readily recharged and reducing pumping in areas of the aquifer that are more difficult to recharge. In addition to offsetting existing potable water demands with recycled water supplies, this is accomplished by supplying in-lieu and injected recharge to the Pleasant Valley basin and south Oxnard Plain areas where it is needed most. A similar amount of water would be pumped from the Oxnard Plain Forebay basin. This strategy moves a considerable amount of extractions from areas that are overpumped to the easily-recharged Oxnard Plain Forebay basin.

Because M&I non-potable and agricultural demand is lower in the winter and recycled water cannot be effectively utilized during that time, a direct recharge component is necessary to accommodate the winter quantities of recycled water. A configuration of injection wells along Highway 1 and Hueneme Road was examined using the Ventura Regional Groundwater Model; this conceptual configuration is discussed in the EIR for the GREAT Project (City of Oxnard, 2005). Injecting water during only a portion of the year is less effective than with full-time injection; the addition of supplemental waters to use for injection is discussed as another strategy of this management plan.

Two FCGMA policy issues need to be addressed relative to the GREAT project. The FCGMA has allowed a one-for-one earning of storage credits – one acre-foot of stored water equals one acre-foot of storage credits – that has been applied to such projects as Calleguas MWD's Las Posas ASR project. When water is injected into a groundwater barrier to contain saline intrusion, however, some of the injected water will likely be tainted by the saline waters. The policy question then becomes whether the entire injected water should earn one-for-one storage credits; this is largely a policy decision rather than a technical decision.

The other FCGMA policy issue relates to pumping the storage credits from the Oxnard Plain Forebay basin. Moving the location of pumping to the Forebay is beneficial to the Pleasant Valley and Oxnard Plain basins, providing that the added pumping stress in the Forebay can be accommodated. For other strategies that involve pumping in the Forebay (e.g., Saticoy Wellfield, Supplemental M&I Water Program), there is a caveat that pumping not occur when groundwater levels have dropped below a threshold that applies to the use of water from the Freeman Diversion as a grant condition from the State Water Resources Control Board (available Forebay storage of 80,000 AF, using two index wells). Such a caveat is also appropriate for the GREAT project. The City of Oxnard can accommodate such an operational requirement by shifting its pumping to wells in the Oxnard Plain just outside of the Forebay when groundwater levels are low in the Forebay. The FCGMA should implement a general policy for all projects that shift pumping from overdrafted areas to the Forebay.

In addition, there are water quality concerns with injection of recycled water. The GREAT project will be performing a Title 22 analysis to permit this injection, which is administered by the Los Angeles Regional Water Quality Control Board with input from the California Department of Health Services. Water quality monitoring will be required by the permit; the FCGMA should review any proposed monitoring and comment to the Regional Board as needed.

9.1.2 Potential Effectiveness

This planned GREAT project would implement one of the strategies likely to be successful in restoring groundwater levels in the Pleasant Valley and Oxnard Plain basins. As part of the EIR for this project, the Regional Groundwater Model was used to test the effects of the project. The project was tested both at the lower initial yield and at full implementation. The effectiveness of the project must be judged by balancing raising Lower Aquifer System water levels in the Pleasant Valley basin and south Oxnard Plain areas against lowering water levels in the Oxnard Plain Forebay basin. The groundwater model indicated water levels in the LAS beneath the southern Oxnard Plain basin and the Pleasant Valley basin would rise by as much as 70 feet, whereas UAS water levels in the Forebay basin would only drop by about 5 feet during wet periods and 20 feet during dry periods. Thus, the project will have to carefully balance the positive and negative effects on water levels. Potential mitigation of lowered water levels in the Forebay include inducing more recharge from existing facilities and from potential increased diversion rights at the Freeman Diversion. The results of the groundwater modeling suggest that BMOs for groundwater levels would be met 51% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 36% of the time in the Lower Aquifer (compared to 5% with current management strategies) with full construction of the GREAT project.

If current recharge is reduced in the Forebay because of required fish flows or other reasons, then the Forebay basin may not be able to accommodate increased pumping, particularly in dryer periods. The City of Oxnard will conduct a monitoring program as part of the GREAT project to measure effects of the project. It would be prudent for the FCGMA to have a written agreement on operation of the GREAT project to ensure long-term operation of the project would continue to meet Agency strategies.

9.2 SOUTH LAS POSAS BASIN PUMP/TREAT

This management strategy is ranked high because it is in a mature stage of design and the problem that it aims to help solve is an ongoing problem for the Las Posas basin that needs a rapid solution to prevent further water quality degradation.

9.2.1 Description

As discussed in section 5.1.3 *High Salinity Associated with High Groundwater Levels*, high groundwater levels in the South Las Posas basin have apparently dissolved salts from the unsaturated portions of the shallow aquifer and created a mound of water more saline than ambient groundwater. One potential mitigation measure would be to pump the saline groundwater from the shallow aquifer, creating space in the aquifer thus allowing less-saline winter storm water to percolate into the aquifer. Under the current conditions, the majority of these winter flows now bypass the recharge areas because there is no available storage in the shallow aquifer. If implemented, this strategy would involve the pumped saline water being blended with low-chloride water and/or desalinated before delivery to customers.

Ventura County Waterworks Districts #1 (Moorpark) and #19 (Somis) are working with the Calleguas MWD to design and fund such a pilot project in the South Las Posas basin. The pumping associated with such a project would be in excess of current FCGMA allocations and would require approval of the FCGMA Board prior to implementation. Under FCGMA Resolution 2003-03, the Board indicated that upon its review and approval, it may change or alter an allocation for pumping from the South Las Posas basin to accommodate a responsible entity that submits a plan to render this groundwater usable. A general FCGMA policy for these types of projects in the future is discussed in section 11.3 *Recommended Additions to FCGMA Policies.*

9.2.2 Potential Effectiveness

The effectiveness of this particular strategy can be evaluated using two criteria. The first is the overall reduction in salts in the South Las Posas basin because higher-salinity groundwater is extracted and treated, removing salts from the system. The improvement in water quality in the basin would depend upon the amount of groundwater extracted and the amount of water recharged versus the ability of the aquifer or other sources to contribute additional dissolved salts. Another measurement of effectiveness would be the efficacy of drawing down the shallow groundwater to create space for recharge of better quality rain water. Greater drawdown could create conditions more favorable to recharge thus allowing more “fresh water” into the basin. It could also create space for addition salt-impacted waters. Thus, there are several factors that control the effectiveness of removing salts by pumping and treating the groundwater.

It is not possible at this time to adequately combine the factors to determine overall potential changes in water quality, although it is likely that dissolved salts removed during extraction and treatment would remove at least a portion of the salt load in the basin. Further analysis of nature and extent of the of the salts, quantification of the salt inputs (for example, mass balance), and evaluation of potential removal efficacy may be necessary to estimate the potential success of this strategy.

9.3 DEVELOPMENT OF BRACKISH GROUNDWATER, PLEASANT VALLEY BASIN

This strategy is also highly ranked because it can be implemented relatively quickly, may prevent water quality degradation in the northern Pleasant Valley basin, and would reduce pumping in the middle of the largest pumping depression in the Pleasant Valley basin.

9.3.1 Description

There are additional areas along Calleguas Creek besides the South Las Posas basin where groundwater has elevated salinity. Base flow from the Arroyo Las Posas has migrated completely across the South and East Las Posas basins and into the northernmost Pleasant Valley basin, providing a source of recharge to this portion of the Pleasant Valley basin. However, this recharge water has created water quality problems for groundwater pumpers. There are additional areas along Calleguas Creek besides the South Las Posas basin where groundwater has elevated salinity. Base flow from the Arroyo Las Posas has migrated completely across the South and East Las Posas basins and into the northernmost Pleasant Valley basin, providing a source of recharge to this portion of the Pleasant Valley basin. However, this recharge water has created water quality problems for groundwater pumpers. City of Camarillo wells in this area have experienced increased salts as groundwater levels have risen over the last decade (Figure 21), similar to the condition described in section 9.2 *South Las Posas Basin Pump/Treat*.

It is not yet clear if this recharge water from the Arroyo Las Posas will create a mound of poorer-quality groundwater that would move out into the main portion of the Pleasant Valley basin under recharge conditions. This would depend upon how well-connected the recharge area is to the main portion of the LAS in the Pleasant Valley basin. The City of Camarillo is considering a strategy to move some of its current pumping from the area of the LAS pumping depression in the central portion of the Pleasant Valley basin to the northern portion of the basin where rise in poorer-quality groundwater is being observed. Under this plan, the poorer-quality water would be extracted and desalinated in a similar manner to the South Las Posas basin project.

The City of Camarillo has assessed the feasibility of constructing a Groundwater Treatment Facility that would be located in the Somis Gap area of the Pleasant Valley Basin (Black and Veatch, 2005). The study determined the project to be technically feasible and would allow Camarillo to halt pumping from an area of the LAS with depressed groundwater levels and instead pump in an area of rising groundwater levels.

Camrosa Water District is considering another type of project that potentially develops the use of brackish groundwater. In an area of the eastern portion of the Pleasant Valley basin near California State University, Channel Islands along Calleguas Creek, Camrosa has been studying the possibility of extracting poor-quality Upper Aquifer(?) water, treating it, and putting it in their delivery system. This water, some of which was used historically, has risen to relatively high levels. Water quality monitoring in the adjacent main portion of the Pleasant Valley basin indicates that this poorer-quality water may not be migrating into the Lower Aquifer of the Pleasant Valley basin. Thus, there is the possibility this water could be pumped without lessening the supply to the Pleasant Valley basin. Some of this area is outside the FCGMA boundary.

Previously, both the potential Camarillo and Camrosa projects would have to be pumped using existing allocations if the well was within the FCGMA boundary. However, as FCGMA policy has evolved over time, pumping of poorer quality groundwater without an allocation has been evaluated on a case-by-case basis. A coordinated effort between the FCGMA and proponents of such projects in the Pleasant Valley basin should be undertaken to determine whether these projects are within this policy. Also, a feasibility analysis of these projects may be necessary to determine the potential net effects to the area and evaluate whether additional pumping would improve or degrade current water quality conditions. This FCGMA policy issue is discussed in more detail in Section 11.3 *Recommended Additions to FCGMA Policies.*

9.3.2 Potential Effectiveness

Pumping and removing salts from groundwater is an effective means of reducing the salt load in a watershed. If the areas from which the salts are removed are hydrologically connected to the main portions of the groundwater basins within the FCGMA, then this removal of salts could also have a positive impact. If the pumping of this poorer-quality groundwater does not affect the main groundwater basins, then these projects would have a neutral effect on the main groundwater basins while increasing the supply of available water. However, if these projects reduce the recharge to the FCGMA groundwater basins without also providing a significant benefit to water quality in these basins, than the projects could have a negative impact on the groundwater basins within the Agency. Any such projects would require monitoring of both water levels and water quality to determine their effect on adjacent areas of the basin.

The potential City of Camarillo project also has an element of moving existing pumping from the area of the Pleasant Valley basin near the Camarillo airport, which has the most-depressed groundwater levels, to an area more favorable for recharge along Arroyo Las Posas. The portion of the potential project related to the pumping reduction was tested using the Ventura Regional Groundwater Model (see Appendix B). Model results indicate that the worst portion of the pumping depression would be decreased considerably in size, leaving a smaller depression in the southern Pleasant Valley basin. The other element of the project, increasing pumping along the Arroyo Las Posas, cannot yet be tested effectively with the model. The model does not now capture the hydrogeology of the northernmost portion of the Pleasant Valley basin – a recharge area of the basin near Somis that is now apparent from monitoring data needs to be better understood and integrated into the model.

9.4 NON-EXPORT OF FCGMA WATER

This strategy is important in preventing additional un-authorized pumping within FCGMA basins, where additional strategies are required to mitigate <u>current</u> pumping. The strategy can also be implemented rather rapidly through FCGMA actions.

9.4.1 Description

Current policies and ordinances limit the use of groundwater produced from within the FCGMA to only those areas within the boundaries of the Agency with only rare exceptions. In 1997, original or prior historical uses outside the FCGMA boundary that were not known in 1985 were allowed through grandfathering of these uses. Since 1997, however, recent aerial photo analysis of new developments and additional crops grown near the FCGMA boundary indicate that there is a “fringe” of crops or additional lands being irrigated outside the boundary that are apparently being irrigated by groundwater produced from within the FCGMA. In most cases, these crops are contiguous across the FCGMA boundary from inside the boundary to outside the boundary; in some cases, the crops are grown on a parcel that spans the boundary. Some of these crops may have been planted in earlier years, but air photo analyses indicate that a portion of the crops have been planted in the last several years.

When the FCGMA was formed, it was envisioned that some undeveloped acreage within the FCGMA would be developed in the future and would create a new water use. A baseline allocation of one acre-feet per acre of water was to be allocated to any newly-developed lands. However, this baseline allocation was only for land within the FCGMA boundaries. If groundwater produced from inside the FCGMA boundaries was used on adjacent hillsides outside of the FCGMA boundary, this new irrigation would provide considerable extra draft on the groundwater basins. This additional draft on the aquifers is counter to all the FCGMA policies aimed at reducing pumping in the overdrafted aquifers.

Preventing this additional draft on the aquifers is clearly a high priority of this management plan. It appears that current ordinances and policies of the FCGMA may be sufficient to deal with its export issue, but this should be reviewed. What is needed is a regular procedure to both educate pumpers of the export policy and to identify areas where this policy has been violated. It is recommended that the FCGMA developed such a procedure and determine how to address past and current violations of this policy.

9.4.2 Potential Effectiveness

Preventing additional draft on the groundwater basins of the FCGMA is equivalent in effectiveness to pumping reductions. Many of the areas where water is exported across the FCGMA boundary are adjacent to the Pleasant Valley and Las Posas basins where lowered groundwater levels are particularly apparent. Therefore, much of this additional draft on the groundwater basins is occurring in the areas of the aquifer that can least sustain them. This fact increases the effectiveness of preventing these water exports.

9.5 CONTINUATION OF 25% PUMPING REDUCTION

This strategy is already in place, but is being reviewed by the FCGMA Board.

9.5.1 Description

Current FCGMA management strategies include the 25% reduction in pumping allocation that was called for in the original management plan. This management strategy is to continue the planned reductions as they were originality intended -- the planned reduction to 20% of allocation occurring during 2007 (delayed from 2005) and the 25% reduction occurring according to the 2010 schedule. These reductions were to stay in force until the FCGMA basins are no longer in overdraft and there is sufficient water for recharge to compensate for the increased pumping created when the restrictions are removed.

9.5.2 Potential Effectiveness

The original 25% pumping reduction has had the effect of reducing both M&I pumping and agricultural pumping (see section 8.3 *Effectiveness To-Date of Current Management Strategies*). The effect of continuing the phased reductions to the full 25% reduction was modeled using the Ventura Regional Groundwater Model. This model scenario assumed that pumping reductions beyond the current 15% reduction were applied only to M&I pumping; it was assumed that any agricultural wells currently using their reduced pumping allocation for FCGMA reporting would simply shift to an efficiency calculation, rather than further reduce pumping. The results of the modeling suggest that these additional pumping reductions, which amount to 3,800 acre-feet per year throughout the FCGMA, would raise groundwater levels in the Upper Aquifer System by a little over one foot at the Port Hueneme coastline and raise Lower Aquifer System groundwater levels by an average of a little over two feet. BMOs for groundwater levels would be met 53% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 7% of the time in the Lower Aquifer (compared to 5% with current management strategies).

9.6 RIVERPARK RECHARGE PITS

This strategy is being implemented through a Joint Powers Agreement between the City of Oxnard and United Water Conservation District.

9.6.1 Description

Decades of relatively unrestricted deep gravel mining beginning in the 1950s created a series of large open pits (formerly owned by S.P. Milling) along the Santa Clara River within the Oxnard Plain Forebay basin that are now unused and expose groundwater in the pits to evaporation and potential contamination. As part of an agreement between the City of Oxnard, a developer (RiverPark), the FCGMA, County of Ventura, and UWCD, these pits are being stabilized and urban surface drainage is being diverted away from the pits. If all the work on the pits is accomplished appropriately, the plan is to have UWCD operate the pits as a recharge and storage facility. UWCD would build a water conveyance system that would allow flood flows diverted at the Freeman Diversion to be transported to the RiverPark pits for recharge. These facilities would allow increased diversions of the Santa Clara River; silt-laden river water could be diverted and recharged, water that now must be bypassed and which flows to the ocean following large rainstorms.

Use of the RiverPark pits serves two purposes for the aquifer. First, the facilities will allow additional recharge to the aquifers from silty water that is now bypassed at the Freeman Diversion. Second, the project moves a portion of the Forebay recharge further down-gradient in the basin, away from the recharge mound that forms in the upgradient portions of the Forebay basin beneath the UWCD Saticoy Spreading Grounds. Thus, more recharge water will infiltrate into the Forebay during wet years, a time when a recharge mound builds in the upgradient portion of the basin and reduces recharge rates in existing spreading facilities. No FCGMA policy changes would be required to implement this project.

9.6.2 Potential Effectiveness

UWCD has analyzed the effectiveness of the RiverPark recharge project by combining UWCD's surface water model with the Ventura Regional Groundwater Model. This modeling suggests the yield of the project could be as much as 4,000 AFY (combined with a higher diversion rate at the Freeman Diversion), with the annual yield ranging from 400 AF in dry years to 11,500 AF in wet years. This additional recharge in the Forebay will raise water levels in the basin, which helps pressurize the greater Oxnard Plain. In addition, higher water levels in the Forebay basin will help mitigate the effects of other projects described in this management plan that rely on increased pumping in the Forebay.

The results of the groundwater modeling suggest that BMOs for groundwater levels would be met 52% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 6% of the time in the Lower Aquifer (compared to 5% with current management strategies).

10.0 POTENTIAL FUTURE MANAGEMENT STRATEGIES

Groundwater modeling indicates that additional management strategies are required to eliminate overdraft in both Upper Aquifer and Lower Aquifer System aquifers and to prevent further seawater intrusion along the coastline and saline intrusion in more inland areas. A variety of potential future strategies are ranked below, with those that are the most effective and can be implemented the soonest discussed first. Because of the large number of strategies, they are separated into those that can be implemented within 5 years, 10 years, 15 years, and greater than 15 years.

10.1 5-YEAR STRATEGIES

The following strategies that can be implemented within five years are ranked by order of effectiveness and/or importance.

10.1.1 5-Year Update of FCGMA Management Plan

10.1.1.1 __Description__

It is recommended that this Plan be updated every five years. This update should include a status of how the BMOs are being met, effectiveness of strategies that have been implemented, status of other recommended strategies, and recommendations for any additional management strategies.

10.1.1.2 __Potential Effectiveness__

Updating the Plan every five years will be an effective milestone for the FCGMA to evaluate and re-evaluate its course of action. This will keep the FCGMA's goals and its successes and failures front and center where they belong.

10.1.2 A Plan To Shift Some Pumping Back to Upper Aquifer System

10.1.2.1 __Description__

One of the initial groundwater management strategies for the FCGMA was to shift pumping to the Lower Aquifer System from the Upper Aquifer System to relieve pumping stresses that created a pumping trough in the UAS on the Oxnard Plain basin. This was accomplished by requiring new and replacement wells to be drilled in the LAS. Now that it is clear that the LAS cannot accommodate all this new pumping, it would be prudent to move some of the LAS pumping back to the UAS. However, this must be done very carefully to prevent a shift that would again create problems in the UAS.

A shift in pumping back to the UAS has already been initiated through County well permitting requirements. However, this shift cannot be uniformly enforced across the basins within the FCGMA. A detailed plan must be formulated that takes into account local recharge sources, hydrologic connection between portions of the basin, and current/future in-lieu recharge projects. This should be accomplished through use of the Ventura Regional Groundwater Model in fine-tuning the details of this plan, with the FCGMA, VCWPD, and UWCD working together.

10.1.2.2 __Potential Effectiveness__

By shifting pumping from the LAS to the UAS in areas where the Lower Aquifer System is not readily recharged could substantially raise groundwater levels in critical areas of the basins. This strategy only works, however, if the increased UAS pumping can be accommodated by the shift in pumping. For this reason, a sophisticated tool such as the Ventura Regional Groundwater Model is required to predict where and how much pumping should be shifted.

For an indication of how this strategy might work, 5,000 AFY of Lower Aquifer pumping was moved to the Upper Aquifer in the triangular area of the south Oxnard Plain from the Port

Hueneme zone of low conductance (fault?) to the western edge of the Pleasant Valley basin. The results of the groundwater modeling suggest that BMOs for groundwater levels would be met 50% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 9% of the time in the Lower Aquifer (compared to 5% with current management strategies) – raising Lower Aquifer water levels at BMO wells an average of 8 feet (Table 8).

10.1.3 Protect Current Sources of Recharge

10.1.3.1 Description

Protecting current sources of recharge to the FCGMA basins is particularly important as we face additional groundwater management problems. Maintaining Santa Clara River flows and water quality has been a focus for Ventura County over the past decade. The County of Ventura and UWCD went to court in the late 1990s to ensure that increasing land development and water use in the Santa Clarita area of Los Angeles County did not jeopardize Santa Clara River flows across the County line into Ventura County. More recently, local water agencies and especially the farming community have expressed concerned about rising chlorides from waste water discharges coming from Los Angeles County. It is very important to the FCGMA to continue to protect this important source of groundwater recharge through support of local agencies who deal directly with these issues.

On Calleguas Creek, where a portion of the flow originates from discharges produced by wastewater treatment plants, downstream users have come to rely on the increased flows in the Creek for recharge. Agreements on wastewater discharges flowing down Arroyo Santa Rosa resulted in the Conejo Creek project. Similar flows along the Arroyo Las Posas provide recharge to the Las Posas basins and the northern Pleasant Valley basin. The Arroyo Las Posas flows are augmented by discharges from the Simi Valley and Moorpark wastewater treatment plants and from dewatering of shallow groundwater in western Simi Valley. Similar to the Santa Clara River, maintenance of these flows is necessary to recharge the downstream groundwater basins. As such, the quantitative effects of shallow groundwater extraction in the Las Posas and northern Pleasant Valley Basins may need to be evaluated for the potential impacts to downstream surface water flows.

10.1.3.2 Potential Effectiveness

The current sources of recharge to the groundwater basins within the FCGMA are essential not only in maintaining current management strategies but also in implementing future strategies. Without protecting current recharge sources, the overdraft within the FCGMA could increase and negate some of the benefits realized by projects and strategies that have been very successful to date. Therefore, this strategy is one of the most effective in reducing overdraft, and is an essential FCGMA strategy.

10.1.4 Limitation on Nitrate Sources in Portions of the Oxnard Plain Forebay Basin

10.1.4.1 Description

High nitrate concentrations are present in groundwater in portions of the Oxnard Plain Forebay basin (see section 5.1.4 *Nitrate in Groundwater*). The source of a portion of this nitrate is from fertilizer use on overlying crops. A thick vadose zone (unsaturated zone) between the crops and the groundwater table allows natural processes to degrade some of the nitrate before it percolates with irrigation waters down to groundwater. Gravel pits within the Forebay were generally mined to five feet above historic groundwater levels, with reclamation plan restrictions on growing high-nitrate use crops within the mined pits where the vadose zone is so limited. As reclamation is completed, however, there are no longer crop restrictions. Thus, high-nitrate crops could be grown in these former gravel basins with a limited vadose zone.

The FCGMA should take a leading role in preventing further nitrate contamination in the Forebay. The FCGMA should work with land use planners and the Regional Water Quality Control Board to ensure that high-nitrate crops are not grown in areas with a limited vadose zone caused by gravel mining.

10.1.4.2 Potential Effectiveness

Limiting sources of nitrate is the most effective method of reducing nitrate in groundwater. Because nitrate is a primary drinking water contaminant that can cause serious adverse health effects and because the Forebay is a primary source of drinking water for consumers across the Oxnard Plain, limiting sources of nitrate should be a high priority for the FCGMA.

10.1.5 Policy on Recovery of Credits from Oxnard Plain Forebay Basin

10.1.5.1 Description

There are several management strategies that involve increased pumping in the Oxnard Plain Forebay basin to either supply water to overdrafted areas (e.g., Saticoy Wellfield) or to recover FCGMA credits earned by reducing pumping in overdrafted areas (e.g., Supplemental M&I Water Program, GREAT project). Using the Forebay in such a manner is definitely beneficial to both the Pleasant Valley and Oxnard Plain basins – however, it must be done in a manner such that the added pumping stress in the Forebay can be accommodated. For the Saticoy Wellfield and the Supplemental M&I Program, there is a caveat that pumping not occur when groundwater levels have dropped below a certain threshold. This threshold is the same as the grant condition applied to the use of water from the Freeman Diversion by the State Water Resources Control Board – that there is no more than 80,000 AF of available storage in the Forebay. In practice, this means that the average of combined groundwater levels of two index wells in the Forebay be above a certain level.

To assure a uniform policy, the FCGMA should implement a general policy for all projects that use FCGMA credits to shift pumping from overdrafted areas to the Forebay. It is recommended that this policy follow the State Board criteria discussed above and delineated in Table 9, or equivalent criteria if these wells are not available in the future. In addition, pumping using these credits should not adversely impact other pumpers in the basin. How these adverse impacts are defined will depend upon the specifics of each project and will have to be detailed when individual projects are approved by the FCGMA. It is also recommended that the FCGMA establish a policy for prioritizing the types of projects that can use transferred credits to pump in the Forebay. This will be especially important if there is more demand for these transfer projects than the Forebay can accommodate.

Wells Used	*Groundwater Elevations*
2N/22W-12R1 *2N/22W-22R1*	>17 ft above msl for combined groundwater elevations

Table 9. Criteria for using Credits for extraction in the Oxnard Plain Forebay basin.

10.1.5.2 Potential Effectiveness

Shifting pumping from an impacted area to the Forebay through the use of FCGMA credits is a very effective strategy, providing that this pumping doesn't adversely impact the Forebay. Using the criteria outlined in the previous paragraph, Forebay impacts can be avoided or mitigated.

10.1.6 Verification of Extraction Reporting

10.1.6.1 Description

Meters are required to be installed on all but domestic wells by Chapter 3 of Ordinance 8, although not all pumpers have installed meters or use their meters for reporting extractions. In addition, all extractions are self-reported and the accuracy of FCGMA extraction records relies on correct self-reporting. To ensure the accuracy of extraction records, which are used by the FCGMA and others to determine the changing pumping stress on the aquifers in the FCGMA, it is recommended that the FCGMA make periodic random checks on a small number of meters annually to ensure that meters are correctly installed and that the extractions reported by pumpers to the FCGMA correctly reflect actual meter readings.

10.1.6.2 Potential Effectiveness

The accuracy of FCGMA reporting records is important for extraction trends, determination of credits and efficiency, and overall compliance with pumping reductions. It is essential that all pumpers believe that everyone is "playing by the rules" and a verification procedure could help ensure that pumpers continue to believe that everyone is in this together.

10.1.7 Separate Management Strategies for Some Basins

10.1.7.1 Description

The initial FCGMA Management Plan treated all the FCGMA basins the same in that the same rules applied to all basins. We now know more about how these basins are interconnected and whether some of the basins have unique circumstances. For example, we know that the East Las Posas basin is largely hydraulically disconnected from both the West Las Posas basin and the northern Pleasant Valley basin. However, these basins also share some common elements; for instance, the East Las Posas basin and northern Pleasant Valley basin share a common recharge source, the Arroyo Las Posas. One element common to all the FCGMA basins is that they are overdrafted. Current FCGMA management strategies such as pumping reductions are thus appropriate to all the basins.

The FCGMA has considered localized management strategies. In the South Las Posas basin, for instance, a project to pump and treat poor-quality water without an allocation has been considered by the FCGMA Board. The strategy of moving pumping away from coastal areas applies largely to the Oxnard plain basin.

New strategies in this Management Plan are also applied to specific situations in each basin. The Management Plan for the East Las Posas basin, included as Appendix C, addresses issues specific to the operation of Calleguas' ASR project. This plan is adopted as part of the overall FCGMA Management Plan and the FCGMA Board will consider how its elements will be integrated into FCGMA ordinances. Likewise, the strategies for potentially pumping shallow groundwater along Calleguas Creek are also specific to the Pleasant Valley basin. The basin management objectives of this plan are also specific to each basin.

The FCGMA-wide strategy of pumping reductions across all FCGMA basins engenders the most discussion of whether this is appropriate in all cases. As discussed in section 9.5 *Continuation of 25% Pumping Reduction*, these reductions are appropriate across all FCGMA basins as long as there is overdraft in all basins. It would be appropriate, however, to re-evaluate any future additional pumping reductions by examining each basin separately.

10.1.7.2 Potential Effectiveness

The current strategy of allowing specific policies to address individual basin problems is the most effective means of addressing the overdraft and water quality problems within the FCGMA.

10.1.8 FCGMA Boundary

10.1.8.1 Description

The FCGMA boundary is defined as the outer edge of Fox Canyon Aquifer. In most areas, this outer edge is either the outcrop of the Fox Canyon Aquifer (such as along the north and east flanks of the Las Posas basin) or is the point where the Fox Canyon Aquifer onlaps older rocks (such as along the east side of the Pleasant Valley basin). However, along the western boundary of the FCGMA, it is defined as the western edge of the Oxnard Plain Forebay and Oxnard Plain basins (west of which the Fox Canyon Aquifer is not identified). Thus, this western boundary is also the boundary between the Oxnard Plain and Mound basins or the Oxnard Plain Forebay and Santa Paula basins.

Recent work done as part of the Santa Paula Basin Stipulated Judgment has moved the southern boundary of the Santa Paula basin farther north to coincide with the current known location of the Oak Ridge fault. This boundary of the Santa Paula basin was agreed to by experts working for the parties in the Santa Paula Basin Stipulated Judgment, including UWCD, the city of San Buenaventura, and the Santa Paula Basin Pumpers Association. In addition, UWCD groundwater staff have carefully monitored groundwater elevations in wells on both sides of this Santa Paula basin boundary and have confirmed that groundwater elevations south of the adjudicated basin boundary respond to recharge operations in the Oxnard Plain Forebay basin, whereas groundwater elevations to the north of the boundary do not. In addition, there is a significant discontinuity in groundwater elevations from one side of this boundary to the other.

The practical effect of this change in the Santa Paula basin boundary is that there is now a small region between the old and new boundary of the Santa Paula basin (Figure 28) that is not managed under either the Santa Paula Basin Stipulated Judgment or FCGMA rules and regulations. Because this area is in hydrologic continuity with the remainder of the Oxnard Plain Forebay basin, it would be appropriate to move the FCGMA boundary slightly north and east to coincide with the reinterpreted boundary of the Santa Paula basin and to reflect the reality of the continuity of this area with the Oxnard Plain Forebay basin. It is recommended that the FCGMA consider making this boundary change based on the technical information available.

10.1.8.2 Potential Effectiveness

By allowing a strip of land to be unmanaged through either the Santa Paula Stipulated Judgment or the FCGMA, it is possible to site wells on this strip of land and directly benefit from the significant recharge that takes place in the Oxnard Plain Forebay basin, meanwhile adversely affecting downgradient portions of the aquifers that rely on this recharge to repel seawater intrusion. By bringing this area into the FCGMA, wells sited in a strip of land will appropriately be subject to FCGMA extraction allocations and other management strategies. If the land described here is not brought into the FCGMA, it could invite unmanaged pumping that would adversely affect the basins within the FCGMA.

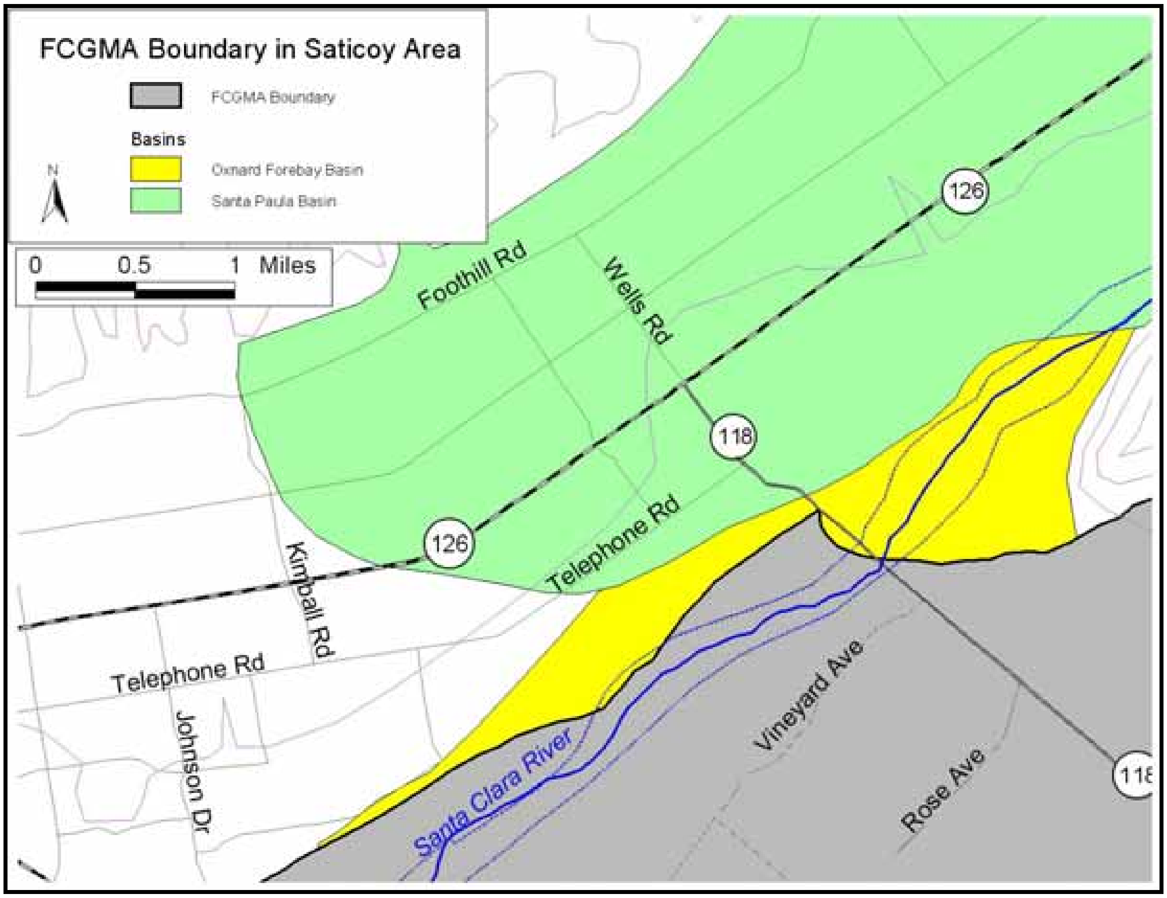


Figure 28. Area southeast of Santa Paula basin where FCGMA boundary is not coincident with current basin boundaries. The yellow area represents the portion of the Oxnard Forebay basin which is currently outside of the FCGMA.

10.1.9 Irrigation Efficiency Calculations

10.1.9.1 Description

Current FCGMA policies allow agricultural pumpers to meet a crop efficiency standard for their irrigation as an alternative to the Historical or Baseline allocation and credit program. This option is called the Irrigation Efficiency allocation. FCGMA efficiency calculations are based on daily information from a set of weather information gathering stations maintained across the FCGMA. Water demand for an index crop (cool season grass) is calculated daily. A crop factor is then applied to this index water demand to adjust the required water demand downward for four major categories of crops grown within the FCGMA. The final step in calculating crop irrigation efficiency is to adjust for 80% irrigation efficiency by taking the annual allowed water demand for each of the four major crop types and allowing an extra 20% water use for salt leaching and irrigation-system inefficiencies. The Irrigation Efficiency allocation was intentionally designed to make it possible for growers to sustain profitable agriculture within the FCGMA, but at the same time raise awareness of water conservation. The FCGMA should review the effectiveness of the efficiency allocation periodically to ensure that it being equitably applied.

In practice, Irrigation Efficiencies that pumpers report to the FCGMA are as a rule quite high – 100% to as much as 300% (water use as little as one third of estimated demand). This suggests the method of calculating Irrigation Efficiency may not be appropriate. Improving the method would not affect the vast majority of pumpers who now report high efficiencies. However, it may identify any pumpers who are not using irrigation water efficiently by making it more difficult for them to reach the minimum required efficiency. It is recommended that the FCGMA Board consider a strategy to examine the method of calculating Irrigation Efficiency. Topics to consider might include adjusting crop demand for more specific crops, re-examining the 80% efficiency requirement, and ensuring that acreages reported be actual irrigated acreage rather than total owned acreage.

10.1.9.2 Potential Effectiveness

It is not clear exactly what amount of reduction in agricultural pumping would occur by adjusting the Irrigation Efficiency calculation. As documented elsewhere in this Management Plan, agricultural pumping reported to the FCGMA has been reduced by as much as 30% since the FCGMA pumping restrictions were initiated. Thus, most agricultural pumpers have apparently increased their irrigation efficiency substantially over the last 15 years. As discussed above, the vast majority of those efficient pumpers are unlikely to be affected by any changes in the Irrigation Efficiency calculation. However, changes in the efficiency calculation might affect those pumpers who have not already improved their irrigation efficiency.

10.1.10 Additional Storage Projects in Overdrafted Basins

10.1.10.1 Description

Aquifer Storage and Recovery (ASR) projects, such as the Las Posas Basin ASR project, provide benefits to an overdrafted basin because water stored in the basin raises groundwater levels above what they would be without the project. The water is not permanently devoted to the basin, but is removed from time to time, generally during periods of water shortage in droughts or emergencies. In practice, the water generally remains in storage for multiple years and is not completely removed during extraction periods. Thus, there is a long-term benefit to the basin. Such projects need to be carefully designed so that neither recharge nor recovery adversely affects other users in the basin. The recovery periods generally cause a significant decline in water levels in the vicinity of the ASR wellfield, especially if the ASR is operated in a confined aquifer setting.

ASR projects are most effective in areas where groundwater levels have been substantially lowered by overdrafting and where the physical properties of the in-situ geologic formation are amenable to both efficient injection and efficient extraction. Within the FCGMA, the Pleasant Valley and south Oxnard Plain areas are both candidates for ASR projects under current conditions because groundwater elevations are continuously below sea level due to overpumping and the geologic formations in these areas have relatively high permeability and transmissivity (e.g., Densmore, 1996; Hanson et al., 2003). To make this strategy effective, saline intrusion currently evident in the south Oxnard Plain would need to be hydrologically isolated from any ASR project to protect the stored water from degradation and to prevent additional intrusion of saline waters during extraction of the stored water. An ASR project could potentially be paired with a barrier well project (discussed in section 10.3.1 *Barrier Wells in South Oxnard Plain*).

The available storage space in the Pleasant Valley and southern Oxnard Plain basins has not been rigorously calculated. The amount of water that has been extracted from coastal areas in excess of recharge has been calculate as about one million acre-feet since the 1950s (UWCD, 2006), with permanent loss of aquifer storage capability from resulting subsidence of about 200,000 AF. The remaining 800,000 AF of potential storage space in the aquifer has been partially refilled by intruded seawater, but there remains a large amount of potential aquifer storage space available.

10.1.10.2 ***Potential Effectiveness***

Storage projects can be effective in restoring groundwater levels in overdrafted basins. However, the restoration only occurs during the period when water is stored in the basin. For many storage projects, the period of storage can be many years and not all the stored water may be removed during the extraction phase of the project – in that case, there is a long-term positive effect on the basin.

There are two issues that must be addressed with any storage project to ensure that the project does not adversely impact a basin: 1) the storage project must not interfere with recharge to the basin by creating groundwater levels so high that there is rejected natural and artificial recharge; and 2) extraction of stored water must not adversely affect the basin and other pumpers by pulling in poor-quality water, dewatering clays and creating subsidence, or creating large cones of depression around project extraction wells that prevent nearby pumpers from using their wells efficiently. Mitigation of such potential impacts may be feasible. Higher groundwater levels from storage projects may also mask continuing overdraft in a basin, so it is essential to continually determine what the basin condition would be without the storage project. Such safeguards are part of the East Las Posas Basin Management Plan (Appendix C) with regards to the Las Posas Basin ASR project.

10.1.11 Penalties Used to Purchase Replacement Water

10.1.11.1 ***Description***

The FCGMA charges a penalty to pumpers for extracting more water than is allowed under the various allocations (Historical, Baseline, Irrigation Efficiency). Up to 2006, this has not generated significant revenue because few pumpers have exceeded their allocation. There may be circumstances in the future, however, where this may not be true. The increased groundwater use caused by the over-pumping could be offset by using the fees generated by penalties to purchase replacement water for the extracted groundwater. This is a strategy used by the Orange County Water District, where the penalty is called a Basin Assessment Fee. The FCGMA has several options to obtain additional water, including purchasing unused portions of Ventura County's State Water Allocation, paying M&I users to increase their imported/groundwater blend, and purchase of water through a variety of programs from the State or others such as turn-back pool water, Dry-Year Purchase Program, and other programs. This water could be delivered through either conveyance down the Santa Clara River or Calleguas MWD's pipeline, depending upon how the water was purchased and used.

10.1.11.2 ***Potential Effectiveness***

A FCGMA policy to purchase water to replace over-pumped groundwater would have a direct effect on the aquifers. If the replacement was done judiciously, more water could be purchased than was originally pumped and/or the water could be used for recharge particularly stressed areas such as the southern Oxnard Plain basin or the Pleasant Valley basin. Thus, the replacement water could actually improve groundwater conditions.

10.1.12 Additional Water Conservation

10.1.12.1 Description

There is a growing move to require the use of recycled water to replace non-potable uses in new developments in California. The FCGMA could encourage local cities and other planning agencies to require a dual plumbing system (where it meets plumbing code) in new developments where it is practical to deliver recycled water of suitable quality. The FCGMA could make this policy known to the permitting agencies through both a resolution sent to these organizations and by commenting on this issue when reviewing EIRs and other planning documents. This policy would be consistent with the requirements in some areas within the Agency, such as the County policy that requires all new golf courses to use 100% reclaimed water and the City of Camarillo that requires dual plumbing systems in new larger developments.

Another water conservation strategy is to require maximum feasible infiltration of stormwater within a new development (Low Impact Development). This strategy is only effective when the development overlies a recharge area for the aquifer. When a development overlies perched water or sealing clay near the surface, the infiltrated water does not benefit the aquifers.

10.1.12.2 Potential Effectiveness

The effectiveness of this policy in reducing pumping depends upon the amount of groundwater that would otherwise be pumped from groundwater and delivered to the project. Many water purveyors within the FCGMA serve a blend of groundwater and imported water, so the pumping savings would be in the groundwater component. The savings would also depend upon the amount of non-potable water needs or uses within these projects. Where there is substantial landscaping in a new project, for example, the savings in potable water would be more substantial. In developments that require a dual plumbing system, there have been estimated savings of 30% to 40% in potable water use just from outdoor landscaping.

As discussed above, the effectiveness of maximizing recharge of stormwater can be variable. When a development is located in a basin such as the Oxnard Plain Forebay, percolation of rain is an important component of recharge and should be protected. In areas where percolated surface water does not reach the aquifers, the strategy is not effective.

10.1.13 Shelf Life for Conservation Credits

10.1.13.1 Description

The initial 1985 FCGMA Management Plan set the policy that when a well operator pumped less than his allocation in any particular year, Conservation Credits were awarded for the unpumped portion of the allocation. The theory behind the Conservation Credit policy was that pumping would vary between wet and dry years; credits would be earned during wet years when pumping was reduced and the credits would then be used during the dry years when above-average pumping was required. With this scheme, pumping credits would theoretically zero-out at the end of each wet-dry cycle. However, no process was put in place to assure that large numbers of Conservation Credits were not accumulated beyond the end at each wet-dry cycle. The practical result of this policy is large numbers of Conservation Credits continue to accrue to some well owners – as many as tens of thousands of acre-feet of Conservation Credits have accrued to some organizations with multiple wells.

The current method of accumulating Conservation Credits with no expiration date has effectively left a large theoretical pumping debt on the aquifers (equivalent to several years of pumping at current extraction rates). This large debt complicates evaluation of the health of the basin because current groundwater conditions do not reflect this unused pumping debt. This is no different than judging a company's financial condition without considering monetary debt.

To bring FCGMA policy into line with the purpose for which credits were originally intended, several approaches are available. Perhaps the most important approach could be to have a limit on the annual use of these credits so that the aquifers would not be overly stressed in any single year. Another approach could be similar to that used in the adjacent Santa Paula basin, where the Stipulated Judgment from the basin adjudication allows unpumped allocations to be accumulated, but unlike in the FCGMA, any unpumped allocations for a single year expire after seven years. In this manner, accumulated debt is restricted to unpumped allocations earned within any single wet-dry cycle.

If unused credits were to expire after a period of time, the strategy would have to reflect a reasonable management strategy that takes into account the needs of pumpers, which vary by water use. For agricultural pumpers, credits are accrued for both future drought conditions and cropping changes. M&I pumpers may have accrued credits by substituting more-expensive imported water to provide a drought or emergency buffer. To ensure that any change in credit policy reflects these varying management strategies, the FCGMA should consider forming a committee (similar to the one that proposed the policy on calibration of meters) to study the issue and make recommendations on any policy changes. There are two issues that would need to be addressed – the shelf life on credits to be earned in the future and the fate of credits earned in the past.

This policy is not appropriate for Storage Credits, where water is stored for both dry periods and for emergencies such as earthquakes or levee failures in the Sacramento Delta. No change is recommended for Storage Credits.

10.1.13.2 Potential Effectiveness

The current policy for Conservation Credits allowing continuing accumulation makes it difficult to determine the current health of the basin – especially when the current pumping debt is equivalent to about three years' total pumping within the FCGMA. Modifying the FCGMA policy to expire older credits would allow a more accurate view of the health of the basin and would prevent a large pumping debt from accumulating. The effect a changed policy would have on future extractions within the FCGMA is not clear. On one hand, credit holders might be encouraged to pump credits prior to their expiration. This might effectively increase FCGMA pumping over its current levels, because some of these credits are currently being accumulated instead of being pumped. Alternatively, under the current policy of accumulating credits, many years-worth of accumulated credits could be pumped in a single dry year far exceeding any annual recharge, adversely impacting the groundwater basins through pulling in poor-quality waters and/or causing irreversible basin subsidence.

10.2 10-YEAR STRATEGIES

The following strategies that can be implemented within ten years are ranked by order of effectiveness and/or importance.

10.2.1 Additional In-Lieu Recharge to South Oxnard Plain

10.2.1.1 Description

One of the most effective management strategies in reducing overdraft is to supply water directly to overdrafted areas. This in-lieu strategy has been very effective in the Upper Aquifer System, where Santa Clara River water delivered through the Pumping Trough Pipeline has helped to alleviate the pumping trough that has been present for several decades beneath the south Oxnard Plain. Because the Lower Aquifer System now has its own pumping trough beneath the same area, extending the Pumping Trough Pipeline and/or bringing in water from other sources to the south Oxnard Plain would likely be equally as effective.

There are several options available to implement this strategy. UWCD could extend the Pumping Trough Pipeline to supply water to pumpers who are south of the current pipeline. The source of this water would likely be a combination of diverted Santa Clara River water and groundwater pumped from the Saticoy Wellfield located in the Oxnard Plain Forebay basin. UWCD has investigated such a project in the past, but costs were prohibitive. Another method of bringing water to the area would be to use Calleguas MWD's regional brine line (under construction in 2006) to bring recycled or other water from upstream areas, providing this water was of sufficient irrigation suitability. A third option would be to use water from Oxnard's GREAT project either for direct delivery to pumpers or for injection into the Lower Aquifer System. Any water delivered through an in-lieu program to this area should be eligible for credits. If there is any transfer of pumping back to the Oxnard Plain Forebay basin as part of a project using this strategy, then the considerations discussed in section 10.1.5 *Policy on Recovery of Credits from Oxnard Plain Forebay Basin* would be applicable.

10.2.1.2 Potential Effectiveness

Reducing pumping and/or injecting water into the aquifer in areas just inland of seawater intrusion can be a very effective strategy. Simulations of the Ventura Regional Groundwater Model that implement this management strategy have been shown to be effective in reducing the overdraft. For example, when 3,000 AFY of additional water are delivered or injected in the south Oxnard Plain, groundwater levels in the Lower Aquifer System rise by an average of 7 feet. The results of the groundwater modeling suggest that BMOs for groundwater levels would be met 53% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 7% of the time in the Lower Aquifer (compared to 5% with current management strategies).

10.2.2 Import Additional State Water

10.2.2.1 Description

As part of a joint integrated water management plan, UWCD and Calleguas MWD are considering expansion of State Water importation by obtaining additional amounts of Ventura County’s State Water allocation on a year-by-year basis when it is not used by other Ventura County agencies. This additional water would likely be delivered to Lake Piru and released as part of UWCD’s conservation release to benefit the Oxnard Plain. Currently, State Water is released from Lake Piru by UWCD as part of its conveyance of stored storm water to downstream basins. Typically, a portion of the released water percolates into basins upstream from the Freeman Diversions and the remainder of the water is diverted for recharge (direct and in-lieu). How this additional State Water is used and accounted for will likely depend upon how it is financed.

10.2.2.2 Potential Effectiveness

The effectiveness of new water importation depends upon how the water is recharged to the aquifers or delivered. If this imported water could be delivered to FCGMA pumpers in-lieu of pumping groundwater, then there would be a direct benefit to the aquifers from reduced pumping proportional to the amount of imported water. If, instead, this water was extracted by pumpers and substituted for a like amount of the imported water that would they would otherwise have delivered by Calleguas MWD, then the effects of the importation would be neutral. Thus, the ultimate fate of this additional imported water would govern the effectiveness of the strategy.

The Ventura Regional Groundwater Model was used to test the effectiveness of importing additional State Water. For the model scenario, the water was imported through Lake Piru, released with UWCD's annual conservation release down the Santa Clara River, diverted at the Freeman Diversion, and recharged in the Oxnard Plain Forebay basin. For the model simulation, it was assumed that 10,000 AFY of additional State Water were purchased in dry and average years. The results of the groundwater modeling suggest that Upper Aquifer groundwater levels in the Forebay basin would rise by an average of 6 feet. BMOs for groundwater levels would be met 54% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 7% of the time in the Lower Aquifer (compared to 5% with current management strategies).

10.2.3 Further Destruction of Abandoned or Leaking Wells

10.2.3.1 Description

With grant support, the FCGMA destroyed 49 abandoned or leaking wells that were considered by the FCGMA and UWCD to have the highest potential for cross-contamination from perched waters into the main aquifers within the FCGMA (cost and feasibility were also considered in ranking the wells for destruction). There remains a long list of additional wells that also have the potential for cross contamination of the aquifers. The FCGMA should give a priority to finding additional funds to continue this effort of well destruction.

10.2.3.2 Potential Effectiveness

Destroying abandoned or leaking wells is very effective in preventing cross contamination of aquifers within the FCGMA. In the Oxnard Plain and Pleasant Valley basins, perched waters have a much higher head (elevation) than underlying aquifers, so the conditions for cross contamination are widespread. Although there are documented cases of this cross contamination occurring, it is not known how widespread this has actually occurred.

10.2.4 Additional Monitoring Needs

10.2.4.1 Description

The current groundwater monitoring program has worked well in tracking saline intrusion beneath the Oxnard Plain. This monitoring network, along with a few other monitoring wells, were installed around 1990 by the US Geological Survey with financing provided by local agencies. Since the initial installation of the monitoring network, the continuing monitoring of these wells has been conducted by UWCD, VCWPD, and the City of San Buenaventura. As the saline intrusion on the south Oxnard Plain has moved inland, UWCD has sited and will drill two new multiple-completion monitoring wells inland of the saline intrusion. This increased monitoring program will adequately track water level and water quality trends on the south Oxnard Plain for the next several years.

In the Pleasant Valley basin, additional monitoring wells might be required if chloride levels continue to increase. The location of these potential monitoring wells would depend upon where the chloride increases occur. In the Las Posas basins, most of the existing monitoring utilizes existing production or injection wells. As part of the East Las Posas Basin Management Plan (Appendix C), new monitoring wells would provide information on the effects of the Calleguas Aquifer Storage and Recovery (ASR) project. Any such monitoring wells would likely be drilled by the Calleguas Municipal Water District. Monitoring of these wells would likely become a part of the overall Calleguas ASR monitoring program.

As more management strategies rely on increased pumping in the Oxnard Plain Forebay basin, increased monitoring will be required to ensure Forebay pumpers are not adversely affected or that pumping does not create additional groundwater problems. Increased monitoring in the Forebay has already been planned during operation of the UWCD Saticoy Wellfield. Additional monitoring should be required by the FCGMA for other projects where pumping will be shifted to the Forebay basin. An example is the GREAT project, where a substantial amount of pumping may be shifted to the Forebay; environmental documentation for the project proposes such increased monitoring. The exact monitoring required for any Forebay pumping that uses a transfer of credits should be appropriate to the location of increased pumping. At a minimum, this monitoring should include collection of monthly groundwater levels and quarterly water quality samples (to include constituents of concern such as nitrate and TDS) should include both Forebay monitoring and monitoring between the Forebay and the coast to determine potential effects in coastal groundwater levels.

10.2.4.2 Potential Effectiveness

Monitoring by itself does not solve the overdraft problem, but it is essential in determining the effectiveness of the other management strategies. In particular, monitoring provides the continuing evaluation of whether basin management objectives are being met, and often serves to increase the understanding of the dynamics of the multiple aquifer systems identified within the FCGMA.

10.3 15-YEAR STRATEGIES

The following strategies that can be implemented within 15 years are ranked by order of effectiveness and/or importance.

10.3.1 Barrier Wells in South Oxnard Plain

10.3.1.1 Description

Seawater barrier wells are used extensively in Los Angeles and Orange counties as a means of controlling seawater intrusion. A barrier project injects water along a series of wells creating a mound of recharge water as protection against seawater moving inland. Barrier wells are both expensive and complex, with costs of maintaining a barrier several times higher than for typical facilities in Ventura County such as the Freeman Diversion, spreading ponds, and distribution pipelines. In Los Angeles and Orange counties, there is a significant component of recycled water in the injected water. Thus, special health regulations govern this type of injection and are a necessary component of plans and facilities. In Ventura County, an attempt to construct a seawater barrier in the late 1970s and 1980s by the California Department of Water Resources in the Port Hueneme area was not particularly successful. Since that attempt, barrier wells were not seriously considered again because lower-cost options were identified.

We now know portions of the aquifer on the south Oxnard Plain are very difficult to recharge. In particular, the Lower Aquifer System of the south Oxnard Plain has been largely unaffected by spreading operations in the Oxnard Plain Forebay basin because this recharge is partially impeded from flowing into the areas of depressed groundwater levels by a fault or other structural barrier (see discussion in section 3.0 *Groundwater Basins and Hydrogeology – Oxnard Plain Basin*). The City of Oxnard GREAT project has evaluated barrier wells in the south Oxnard Plain as a method of delivering recycled water during winter months when agricultural irrigation demand is low. It may be prudent to consider expanding winter injection to more seasons of the year to create a full-time barrier. Additional source water for this full-time barrier would need to be identified.

A difficulty with barrier wells is that the injected water must be of very high quality to prevent clogging of the well screens. Thus, the source water for the injection would likely be a combination of highly-treated recycled water and potable water. The expense of building, maintaining, and providing water to a full-time barrier project currently makes such a project for Ventura County a lower priority. If other projects to supply in-lieu water to the south Oxnard Plain fail to prevent the increasing intrusion of saline waters or if a full-time barrier was considered as an add-on to injection wells already built through the GREAT project, then a full-time barrier project might be economically feasible.

As discussed in section 9.1 *GREAT Project (Recycled Water)*, FCGMA credits for recharge in a barrier project might be less than 1:1 because the recharged water might mix with contaminated saline groundwater. Likewise, if these credits are used for extraction from the Oxnard Plain Forebay basin, these extractions would have to follow uniform procedures addressed in section 10.1.5 *Policy on Recovery of Credits from Oxnard Plain Forebay Basin.*

10.3.1.2 Potential Effectiveness

Barrier wells could be very effective in preventing saline intrusion from moving further inland. Simulations of the Ventura Regional Groundwater Model indicate a barrier project with injection rates of 21,000 AFY into the Lower Aquifer System would raise Lower Aquifer water levels an average of 46 feet at the BMO wells, with an average groundwater elevation at the barrier of 28 ft msl. The rate of injection that was tested in the model was chosen to match the winter injection rate of the GREAT project at full planned implementation.

The groundwater modeling suggests that BMOs for groundwater levels would be met 63% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 48% of the time in the Lower Aquifer (compared to 5% with current management strategies. The barrier project is the most effective strategy modeled in meeting BMOs (Table 8). However, the barrier would not prevent saline intrusion in areas inland of the barrier within the LAS groundwater depression in the Pleasant Valley basin; the only prevention for saline intrusion within the groundwater depression would be to raise groundwater levels within the depression.

10.3.2 Injection of Treated River Water into Overdrafted Basins

10.3.2.1 Description

A management strategy that is commonly suggested is taking diversions from the Santa Clara River when there is abundant river flow and injecting it into the aquifers that have depressed water levels. However, raw river water could not be injected without treatment that would bring the water to at least drinking water quality to prevent well clogging and potential health concerns; the cost of this treatment was generally considered to be prohibitive when compared to other management strategies. This assumption may no longer be correct, as treatment costs become more affordable when compared to alternatives.

Much of the infrastructure to convey water from the Freeman Diversion to Pleasant Valley and the south Oxnard Plain already exists. The costs of the injection would be building a treatment facility, installing injection wells, and operating the treatment plant.

This injection would logically operate during periods when there is more water in the Santa Clara River than recharge facilities can accommodate. These conditions occur following rainstorms during many average precipitation years and can occur for extended periods (several months) during heavy precipitation years. The additional diversions could be conveyed to Pleasant Valley and the South Oxnard Plain via the existing Pleasant Valley and PTP pipelines. The raw water would then be treated and injected. Unlike aquifer storage and recovery (ASR) projects, the water would be placed in the aquifer for recharge purposes and would not be extracted at a later time as part of the project.

10.3.2.2 Potential Effectiveness

Besides reducing groundwater pumping in areas of lowered groundwater levels, providing direct recharge to affected aquifers is the most effective method of reducing pumping stresses and overdraft.

Injection of treated river water could be very effective in raising groundwater levels in the pumping depression in the south Oxnard Plain and Pleasant Valley basins. Simulations of the Ventura Regional Groundwater Model indicate an injection project with rates into the Lower Aquifer System of 1,500 AFY during dry years to 5,000 AFY during wet years would raise Lower Aquifer water levels an average of as much as 13 feet at the BMO wells in the area of injection.

The groundwater modeling suggests that BMOs for groundwater levels would be met 53% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 11% of the time in the Lower Aquifer (compared to 5% with current management strategies.

10.3.3 Increase Diversions from Santa Clara River

10.3.3.1 Description

The Freeman Diversion was designed to divert more river water than current diversions. However, the current water right for the Freeman Diversion permitted by the State Water Resources Control Board is only 375 cfs (cubic feet per second) because other conveyance facilities downstream of the Freeman Diversion were not designed for the higher flow rate. If these conveyance facilities were modified and additional spreading facilities were constructed to physically handle the additional volume of water, a right to a higher diversion rate could be beneficial during periods of high flow in the river. Any higher diversion procedure would have to be designed so that there was sufficient water available for environmental uses. In order to increase diversions at the Freeman Diversion, a modified water right would have to be obtained from the State Water Resources Control Board and appropriate State and Federal agencies would have to be consulted. UWCD is studying options for such an expansion.

10.3.3.2 Potential Effectiveness

The Santa Clara River remains the primary recharge source for the Oxnard Plain basin and supplies significant recharge to the Pleasant Valley basin. It is clear that increased recharge since the Freeman Diversion was constructed has had a major positive impact in reducing seawater intrusion in the Upper Aquifer System. Likewise, many other strategies of this

Management Plan rely on substituting pumping in areas of poor recharge to pumping in the Oxnard Plain Forebay basin, which is easily recharged by water diverted from the Santa Clara River. Additional diversions and recharge to the Forebay basin, therefore, are necessary to make other management strategies possible.

UWCD's River Routing Model was used to predict the amount of additional diversions that were possible from peak winter storm flows at the Freeman Diversion, within the current 1,000 cfs flow capacity limitation of key portions of the conveyance system. The model, which uses daily flow data, predicted that additional potential diversions ranged from an average of 3,000 AFY during dry years to an average of 43,000 AFY in wet years. This additional water was largely recharged in hypothetical recharge facilities in the RiverPark and Ferro mining pits.

The Ventura Regional Groundwater Model simulations suggest that the additional diversions have several beneficial effects. The additional recharge from the diversions raise groundwater levels in the Upper Aquifer of the Oxnard Plain Forebay basin by more than 10 ft, allowing the Forebay to fully fill during wet years and lessening the impact of the dry-year pumping envisioned in other strategies in this Plan. At Upper and Lower Aquifer wells with BMOs, average groundwater levels would increase by about 3 ft. BMOs for groundwater levels would be met 54% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 8% of the time in the Lower Aquifer (compared to 5% with current management strategies.

10.3.4 Shift Pumping to Northwest Oxnard Plain

10.3.4.1 <u>Description</u>

The northwest Oxnard Plain, in the area south of the Santa Clara River, has historically had groundwater elevations that have rarely gone below sea level. There are also no submarine canyons offshore of the northwest Oxnard Plain, eliminating a short-circuit route for seawater intrusion to reach coastal aquifers. Groundwater gradients in the Upper Aquifer System indicate that some of the water recharged to the UAS in the Forebay likely flows offshore in the coastal northwest Oxnard Plain basin. Thus, this portion of the aquifer might sustain some increased pumping without negative consequences. The amount of pumping that could be shifted to this area would depend upon the configuration of the pumping wells and the volume of pumping.

10.3.4.2 <u>Potential Effectiveness</u>

If pumping is shifted from areas that are difficult to recharge, such as the LAS in the southern portion of the Oxnard Plain basin and in the Pleasant Valley basin, to areas that are more-easily recharged, the effect is beneficial to the aquifers. Simulations of the Ventura Regional Groundwater Model indicate that with a shift of pumping of 2,000 AFY from near the edge of the Oxnard Plain Forebay basin to the northwest Oxnard Plain basin, groundwater levels improve less than a foot at wells with BMOs, but drop less than a foot in the northwest Oxnard Plain. Because the current groundwater levels in the Upper Aquifer of the northwest Oxnard Plain are more than 6 ft above their BMO, a more substantial shift in pumping could be accommodated, with a like amount of improvement in other areas of the coastal basins.

10.4 GREATER THAN 15-YEAR STRATEGIES

The following strategies that would be implemented later than 15 years are ranked by order of effectiveness and/or importance.

10.4.1 Additional Reductions in Pumping Allocations

10.4.1.1 Description

After other feasible strategies for reducing the overdraft within the FCGMA are considered, pumping reductions beyond the 25% may have to be examined. As discussed below, any further pumping reductions may not be necessary if most of the strategies discussed in this Plan are implemented. These strategies are likely to be expensive, however, so the FCGMA should retain as a further strategy additional pumping reductions if the means are not found to implement the strategies. Any additional required reductions should be effected using the current system of allocations and efficiencies. If this step is necessary, it would be prudent to revisit whether agricultural efficiency should be tightened up or continue to be used, or whether all pumpers should use the allocation/credit method of reporting. If significant portions of the strategies recommended in this Plan are not implemented, consideration should be given to applying further pumping reductions only in areas where groundwater levels are particularly depressed. For instance, as part of the evaluation of basin yield (section 7.0 *Yield of the Groundwater Basins*), a further reduction of 85% in pumping in the south Oxnard Plain and Pleasant Valley basins allowed groundwater elevations to meet Basin Management Objectives.

10.4.1.2 Potential Effectiveness

The necessity of any further pumping reductions was evaluated using the Ventura Regional Groundwater Model. This modeling suggested that with all strategies implemented, BMOs for groundwater levels would be met 67% of the time in the Upper Aquifer (compared to 51% with current management strategies) and 76% of the time in the Lower Aquifer (compared to 5% with current management strategies. Section 7.0 *Yield of the Groundwater Basins* discusses the issue of how often BMOs should be met to be protective of the basins in the FCGMA. The above numbers suggest that implementation of all the management strategies would vastly improve the health of the basins. Actual future observations of basin conditions, particularly the fate of sweater intrusion, will determine whether these strategies truly protect the basins. The modeling does suggest that further reductions in FCGMA extractions would not be warranted until the effect of the other management strategies can be observed or unless may of the strategies are not implemented because of financial or other reasons. However, implementation of a significant number of the strategies recommended in this Plan would be necessary to avoid further pumping reductions.

11.0 ACTION PLAN TO ATTAIN BASIN MANAGEMENT OBJECTIVES

11.1 PLANNING/IMPLEMENTATION ACTIONS

11.1.1 Strategic Planning

Many of the management strategies in this plan involve considerable cooperation among agencies within the FCGMA and come at considerable cost. The FCGMA is the common element among these agencies and is the appropriate forum in which to discuss the management strategies. Although many of the actual projects that would implement the management strategies would be built and managed by individual agencies within the FCGMA, the cost of the projects is likely to be spread to a wider group. Projects that have the most advantageous cost/benefit ratios would likely be supported by this wider group.

The FCGMA should initiate the discussion of how all the strategies fit together with current and future project of individual agencies. The topics to be covered could include:

1) Cost/benefit analyses of management strategies;

2) Cooperative efforts needed;

3) Methods to finance the projects;

4) Actions to implement the projects.

Parts of the analyses needed for the discussion have already been generated through agency's master planning efforts either within agencies or as larger cooperative efforts, and these plans cold be used as the starting point in these discussions.

11.1.2 Implementation

As a follow-up to the strategic planning effort, the FCGMA should take the results of the strategic planning and facilitate their implementation. The main focus of this effort would be to assist in cooperative efforts to implement the FCGMA management strategies.

11.2 RECOMMENDED CHANGES TO EXISTING FCGMA POLICIES

11.2.1 Continuation of 25% Pumping Reduction

Groundwater modeling of extending the phased FCGMA pumping reductions to their conclusion at 25% reductions indicated that this policy results in modest improvements at BMO indicator wells. Despite these modest improvements, it is necessary to continue this policy because the modeling also indicated that it will take the combination of all of the strategies recommended in this Plan to reach BMO goals – although individual strategies may not make large contributions, the sum of these strategies is the key to solving the overdraft problem. It is recommended that the FCGMA Board implement the delayed reduction to 20% before the end of 2007 and implement the reduction to 25% on the 2010 scheduled date.

11.2.2 Credits to be Transferred to Forebay Basin

Current water conservation facilities and FCGMA policies encourage reduced pumping in areas of seawater intrusion or overdrafted areas by moving those pumping stresses to areas that are more readily recharged. Examples of these projects are the Oxnard-Hueneme Pipeline system, the Pumping Trough Pipeline, and the Pleasant Valley Pipeline. A more recent transfer is for credits accrued by the Conejo Creek project to be used for extractions from the Oxnard Plain Forebay basin as part of the Supplemental M&I Water Program. The program has criteria to prevent adverse impacts from this increased pumping in the Forebay, including a restriction on pumping when groundwater elevations in key wells in the Forebay are below pre-determined levels.

The FCGMA should establish a policy for future credit transfers to the Forebay. This policy should include both criteria to ensure that projects do not harm the Forebay and to prioritize future projects if there is more demand for these transfers than the Forebay can accommodate. The Conejo Creek-Supplemental M&I Water projects serve as a good model for future projects that would provide in-lieu recharge or injection through wells in overdrafted areas and then recover that water from the Forebay or other areas that are readily recharged. Any such pumping using FCGMA credits should be able to demonstrate that a plan for increased pumping would not adversely impact the basin pumped. The FCGMA should encourage these types of projects, as long as there is a net benefit to the aquifers and the pumping does not adversely affect that basin. Specific criteria that the FCGMA could use for future projects are discussed in section 10.1.5 *Policy on Recovery of Credits from Oxnard Plain Forebay Basin*.

11.2.3 Shift Some Pumping from Lower Aquifer System to Upper Aquifer System

A shift in pumping back to the UAS has already been initiated through County well permitting requirements. However, this shift should not be uniformly enforced across the basins within the FCGMA. A detailed plan must be formulated that takes into account local recharge sources, hydrologic connection between portions of the basin, and current/future in-lieu recharge projects. This should be accomplished through use of the Ventura Regional Groundwater Model in fine-tuning the details of this plan, with the FCGMA, VCWPD, and UWCD working together.

11.2.4 Irrigation Efficiency Calculation

As discussed in section 10.1.9 *Irrigation Efficiency Calculations*, the irrigation efficiency calculation should be revisited to ensure that the methodology gives appropriate results. The FCGMA Board should convene a committee of experts and stakeholders to examine the efficiency methodology. This committee would incorporate current methods of determining crop demand, including recommending updated weather station technology if necessary. The purpose of this exercise is to ensure that the efficiency calculations submitted to the FCGMA by agricultural irrigators are accurate. Any changes to the methodology should focus on improving actual irrigation efficiency by pumpers and ensuring pumpers reporting actual groundwater use against their allocation are on the same “level field” as those using irrigation efficiency.

The committee would also review whether 80% irrigation efficiency is appropriate to current farm management methods or whether this efficiency percentage should be changed. The committee should be convened within six months of adoption of this Management Plan. Recommendations of the committee would be presented to the FCGMA for possible modification of current ordinances.

11.2.5 Additional Monitoring

Additional monitoring may be required by the FCGMA when certain management strategies are implemented. For instance, projects that rely upon new pumping from the Forebay basin, as a result of water delivery to areas that are not as readily recharged such as the south Oxnard Plain, may require additional monitoring to ensure that other Forebay pumpers are not adversely impacted. It is recommended that this additional monitoring be a condition of approval for applying pumping credits to the Forebay when they are earned elsewhere within the FCGMA.

Additional monitoring is also required as part of the East Las Posas Basin Management Plan (Attachment C). This additional monitoring is incorporated in the FCGMA Management Plan by reference.

In addition, monitoring should also be required for projects in the future that pump poor-quality water without an allocation along Calleguas Creek. This monitoring would focus on detecting both improvements in water quality in the pumped area and un-anticipated changes in water levels or water quality in adjacent portions of the FCGMA aquifers.

11.2.6 Use Penalties to Purchase Replacement Water

The FCGMA charges a penalty to pumpers for extracting more water than is allowed under the various allocations (Historical, Baseline, Irrigation Efficiency). The increased groundwater use caused by the over-pumping could be offset by using the fees generated by penalties to purchase replacement water for the extracted groundwater. The FCGMA has several options to obtain additional water, including purchasing unused portions of Ventura County's State Water Allocation, paying M&I users to increase their imported/groundwater blend, and purchase of water through a variety of programs from the State or others such as turn-back pool water, Dry-Year Purchase Program, and other programs. This water could be delivered through either conveyance down the Santa Clara River or Calleguas MWD's pipeline, depending upon how the water was purchased and used.

11.3 RECOMMENDED ADDITIONS TO FCGMA POLICIES

11.3.1 5-Year Update of FCGMA Management Plan

It is recommended that this Plan be updated every five years. This update should include a status of how the BMOs are being met, effectiveness of strategies that have been implemented, status of other recommended strategies, and recommendations for any additional management strategies.

11.3.2 Separate Management Plans for Some Basins

All of the basins within the FCGMA are managed under an umbrella of this Management Plan. However, there are circumstances in some of the basins that require additional management policies, such as in the East Las Posas basin. It is recommended that the FCGMA Board adopt the East Las Posas Management Plan (Appendix C) by resolution. In addition, the policies on pumping and treating poorer quality groundwater without an allocation should be incorporated into FCGMA policy by adopting this overall FCGMA Management Plan.

It is recommended that no changes be made to current FCGMA pumping reductions that treat all the FCGMA basins the same. It would be appropriate to revisit this policy in the future if basin management objectives have been achieved in a particular basin; the FCGMA Board might consider whether it is appropriate to continue with additional pumping reductions.

11.3.3 Adoption of Basin Management Objectives

The basin management objectives recommended in this Management Plan should be adopted by resolution by the FCGMA Board. As additional information becomes known about individual groundwater basins, it may be appropriate to modify the recommended objectives and/or to add additional objectives.

11.3.4 Extractions of Poor-Quality Water Without an Allocation

There are additional areas along Calleguas Creek besides the South Las Posas basin where groundwater has elevated salinity. Base flow from the Arroyo Las Posas has migrated completely across the South and East Las Posas basins and into the northernmost Pleasant Valley basin, providing a source of new recharge to this portion of the Pleasant Valley basin. However, this new recharge water has created water quality problems for groundwater pumpers. City of Camarillo wells in this area have experienced increased salts as groundwater levels have risen over the last decade, similar to what has already happened in the South and East Las Posas basins.

Extraction of this groundwater is an appropriate groundwater management strategy providing that either: 1) extracting the groundwater improves the overall water quality in the basin without also causing overpumping of the basin or 2) extracting the groundwater provides a new water supply outside of those currently allocated by the FCGMA. If these conditions are not met, then the extractions should be debited against an existing allocation. In the South Las Posas basin, for example, pumping and treating the shallow groundwater would both improve the water quality and not reduce supplies to the basin (better quality stormwater that now bypasses the basin would then have the ability to infiltrate and replace the pumped water). Alternatively, if shallow groundwater along Calleguas Creek was not hydraulically connected to the main portion of the basin, and pumping that groundwater would have no effect on groundwater in the main basin, then pumping this groundwater could provide a new supply of water. This lack of hydrologic connection would have to be demonstrated using standard geologic techniques. These techniques would include analysis of groundwater levels, water quality parameters, well logs, age-dating, geochemical analyses, or other techniques.

11.3.5 Barrier Wells

As discussed in section 10.3.1 *Barrier Wells in South Oxnard Plain*, construction of injection barrier wells near the coastline to prevent landward migration of saline intrusion is one management strategy. Under current FCGMA policy, any project in the future that has barrier wells as a project component would need FCGMA approval to earn extraction credits that could be used to pump a like amount of groundwater elsewhere within the FCGMA. As discussed in section 10.1.5 *Policy on Recovery of Credits from Oxnard Plain Forebay Basin*, there may be issues related to the pump-back. It is recommended that any such FCGMA approval be contingent upon analysis of the potential effectiveness of the barrier in the improving water quality, analysis showing that pumping credits earned by injection that are used elsewhere does not adversely affect the pumped area, and a monitoring program to measure the effects of both the barrier wells and the extraction wells.

11.3.6 Protecting Recharge Supplies

Because of the importance of preserving current recharge sources for the aquifers and potentially adding additional recharge, the FCGMA adopts a policy that protects these recharge sources. Although the FCGMA cannot determine water rights, it will use its influence with other agencies to ensure protection of the recharge sources. FCGMA actions might include writing letters of support, discussing the issues with other agencies, and testifying at hearings related to these recharge sources.

11.3.7 Nitrate Sources in Oxnard Plain Forebay Basin

It is recommended that the FCGMA develop a policy to limit high-nitrate crops in reclaimed gravel basins where there is little or no vadose zone for degradation of the nitrate before it reaches groundwater. The particulars of this issue are discussed in section 10.1.4 *Limitation on Nitrate Sources in Portions of the Oxnard Plain Forebay Basin*.

11.3.8 Additional Conservation Measures

It is recommended that the FCGMA Board adopt a policy encouraging all planning agencies within the FCGMA to require dual plumbing in new developments where treated wastewater is feasible for use. As part of this policy, the FCGMA should work with planners to incorporate these policies into general plans and other appropriate planning documents.

11.3.9 Verification Procedure for Extraction Reporting

It is recommended that the FCGMA establish a verification procedure to ensure that self-reporting of extractions by pumpers to the FCGMA is accurate. This procedure could be as simple as an annual random inspection of a few meters to ensure that the meter is installed and that the readings that are reported to the FCGMA agree with the meter readings.

11.3.10 Consideration of Further Pumping Reductions

If most of the effective strategies recommended in this Plan are not implemented because of cost, lack of cooperation, lack of will, or some other factor, the FCGMA should consider further pumping reductions. The actual reductions required would depend upon how the basins have responded to the strategies that have been implemented, and the required reductions could be determined using the groundwater model at that time.

12.0 SUMMARY OF FCGMA MANAGEMENT STRATEGIES

FCGMA management strategies are separated into three categories – current, in development, and future. Each strategy has a short description. For a full discussion of each strategy, refer to the earlier three sections on management strategies. Some of these strategies related directly to FCGMA ordinances and other actions. Many of these strategies are carried out by agencies other than the FCGMA, but FCGMA policies either encourage these projects or make them possible through the credit program.

12.1 CURRENT STRATEGIES

Includes those within the original 1985 FCGMA Management Plan and those that have been developed since that time:

- Limitation of Groundwater Extractions – 25% phased reduction in pumping, including 80% agricultural efficiency.
- Encourage Both Wastewater Reclamation and Water Conservation – Encouraged use of recycled water and water conservation techniques.
- Operation of the Oxnard Plain Seawater Intrusion Control Project (UWCD's Pumping Trough Pipeline, Lower Aquifer System Wells, Freeman Diversion) – Encourage UWCD projects.
- Annual Groundwater Monitoring Program – Conducted by VCWPD and UWCD.
- East and West Las Posas Basin Pumping Restrictions – Restricted water use outside La Posas basin and FCGMA boundary.
- Monitor FCGMA Groundwater Extractions – Program of reporting extractions to FCGMA.
- Implementation of Drilling and Pumping Restrictions – Various policies for aquifers used for water production and for well completions.

- Metering of Groundwater Extractions – Required meters on all except domestic wells.
- Fox Canyon Outcrop Expansion Area – Grandfathered some historic areas where groundwater pumped from within the FCGMA is delivered outside of Agency boundaries.
- Noble Spreading Basins – Encouraged expanding UWCD historical artificial recharge areas.
- Las Posas Basin ASR Project – Set criteria for Aquifer Storage and Recovery project in Las Posas basin.
- Conejo Creek Diversion Project – Allowed credits for diversion and delivery of water to pumpers in-lieu of their pumping groundwater.
- Supplemental M&I Water Program – Allowed credits earned in Pleasant Valley basin to be pumped from Oxnard Plain Forebay basin which is more easily recharged.
- Saticoy Wellfield – Groundwater pumped by UWCD from Oxnard Plain Forebay basin is delivered to pumpers in Oxnard Plain and Pleasant Valley basins in lieu of pumping local groundwater.
- Importation of State Water – Credits earned by UWCD for importing State Water for recharge are put in a special account to help solve management problems in the future.
- Calibration of Groundwater Extraction Meters – Meters on wells will now be re-calibrated every three years.

12.2 STRATEGIES UNDER DEVELOPMENT

Includes strategies in which planning and design of projects is currently taking place:

- RiverPark Recharge Pits – Encourage additional recharge facilities in Forebay.
- GREAT Project (Recycled Water) – Credits earned from in-lieu deliveries and injection of recycled can be pumped from Forebay.
- South Las Posas Basin Pump/Treat – Poor quality water can be pumped and treated without using credits.
- Development of Brackish Groundwater, Pleasant Valley Basin – Poor quality water may be able to be pumped and treated without using credits.
- Non-Export of FCGMA Water – Enforce current restrictions on water export; determine procedure for periodic evaluation of whether there are new water exports.

12.3 FUTURE STRATEGIES – 5 YEARS

Includes strategies that could be implemented within the first 5 years (ranked in order of effectiveness):

- 5-Year Update of FCGMA Management Plan – Regular updating of plan, report on BMOs and progress

- Plan to Shift Some Pumping Back to Upper Aquifer System – Shift some new wells back to UAS, with area and number to be determined jointly with UWCD using Ventura Regional Groundwater Model.
- Protect Current Sources of Recharge – Use FCGMA influence with regulatory agencies to ensure that sources of recharge such as the Santa Clara River are not degraded or unduly dedicated to non-recharge uses.
- Limitation on Nitrate Sources in Portions of the Oxnard Plain Forebay Basin – Limit high-nitrate crops in reclaimed gravel basins in Forebay where a vadose zone is either very thin or missing.
- Policy on Recovery of Credits from Oxnard Plain Forebay Basin – Adopt a recommended policy for transfer of credits for pumping in the Oxnard Plain Forebay basin.
- Verification of Extraction Reporting – Annually check a few random wells for meter use and accurate reporting of meter readings.
- Separate Management Strategies for Some Basins – Adopt East Las Posas Basin Management Plan.
- FCGMA Boundary – Adjust FCGMA boundary to conform to Oak Ridge fault and boundary with Santa Paula Basin Adjudication.
- Irrigation Efficiency Calculations – Consider modifying calculations for Irrigation Efficiency Allocation.
- Additional Storage Projects in Overdrafted Basins – Consider storage projects in Pleasant Valley and perhaps southern Oxnard Plain basins, ensuring that the storage does not interfere with current groundwater uses or recharge to the basin.
- Penalties Used to Purchase Replacement Water – Use penalties for pumping beyond allocation to purchase water for recharge to the aquifers.
- Additional Water Conservation – Encourage agencies and cities to require dual plumbing in new developments, where possible, to replace groundwater use with recycled water.
- Shelf Life for Conservation Credits – Allow Conservation Credits to expire after a wet-dry cycle to bring credit policy in line with goals of this program.

12.4 FUTURE STRATEGIES – 10 YEARS

Includes strategies that could be implemented within 5 to 10 years (ranked in order of effectiveness):

- Additional In-Lieu Recharge to South Oxnard Plain – Deliver additional water to southern Oxnard Plain to offset pumping.
- Import Additional State Water – Import and recharge more of Ventura County's State Water Allocation.

- Further Destruction of Abandoned or Leaking Wells – Seek grant funding to reinstate program of destroying abandoned or leaking wells that pose a risk of cross contamination of FCGMA aquifers.
- Additional Monitoring Needs – Support UWCD and VCWPD in determining additional monitoring needs as contamination threats evolve.

12.5 FUTURE STRATEGIES – 10 TO 15 YEARS

Includes strategies that could be implemented within 10 to 15 years (ranked in order of effectiveness):

- Barrier Wells in South Oxnard Plain – Develop a policy for credits for water injected in barrier wells.
- Injection of Treated River Water into Overdrafted Basins – Treat diverted river water to drinking water quality and recharge it through injection in Oxnard Plain and Pleasant Valley basin.
- Increase Diversions from Santa Clara River– Increase diversions of high-volume storm flows for recharge.
- Shift Pumping to Northwest Oxnard Plain – Shift some pumping to the more easily recharged northwestern Oxnard Plain.

12.6 FUTURE STRATEGIES – GREATER THAN 15 YEARS

Includes strategies that could be implemented more than 15 years from now (ranked in order of effectiveness):

- Additional Reductions in Pumping Allocations – As a last resort if the other strategies fail to meet Basin Management Objectives, consider reducing allocations beyond the required 25% reduction. Also consider focusing these reductions in the south Oxnard Plain and Pleasant Valley basins where groundwater levels are particularly depressed.

13.0 REFERENCES

Bachman, S.B., 1999. *Las Posas basin groundwater elevations and water quality*, Joint report to Calleguas Municipal Water District and United Water Conservation District, 35p.

Bachman, S.B., 2002. *Water quality in the East and South Las Posas basin – problems and solutions*, Report to Calleguas Municipal Water District, 25p.

Bachman, S.B., Hauge, C., McGlothlin, R., Neese, K., Parker, T., Saracino, A., Slater, S., 2005. *California groundwater management*, California Groundwater Resources Association, 270p.

Black and Veatch, Inc., 2005. City of Camarillo Groundwater Treatment Facility Feasibility Study, August.

California Department of Water Resources, 1954. *Seawater intrusion: Oxnard Plain of Ventura County*: Bulletin No. 63-1, 59p.

California Department of Water Resources, 1971. *Seawater intrusion: aquitards in the coastal ground water basin of Oxnard Plain, Ventura County*: California Department of Water Resources Bulletin 63-4, 567p.

California Department of Water Resources, 1973. *Seawater intrusion lowers Salinas Valley*, California Department of Water Resources San Joaquin District Technical Report, 42p.

California Department of Water Resources, 2003. *California's Groundwater,* Bulletin 118, http://www.groundwater.water.ca.gov/bulletin118/index.cfm.

California State Water Resources Board (CSWRB), 1956. *Ventura County Investigation*, Bulletin 12, 2 volumes.

CH2MHill, 1993. Technical memorandum hydrogeology and three-dimensional groundwater flow model of the Las Posas basin, Ventura County, California, Report to Metropolitan Water District of Southern California, 58 p.

City of Oxnard, 2005, Environmental Impact Report for GREAT Project, 180 p.

Densmore, J.N., 1996. *Lithologic and ground-water data for monitoring wells in the Santa Clara-Calleguas ground-water basin, Ventura County, California, 1989-95*: U.S. Geological Survey Open-File Report 96-120, 179p.

ETIC Engineering, 2003. *Task 2 Technical Memorandum: Documentation of the Updated Santa Clara-Calleguas Groundwater Flow Mode*l, 14p. January.

Hanson, R.T., 1998. *Draft Simulation of Groundwater/Surface-Water Flow in the Santa Clara-Calleguas Basin, Ventura County, California*, U.S. Geological Survey, Unpublished Water Resources Investigations Report.

Hanson, R.T., Martin, Peter, Koczot, K.M., 2003. *Simulation of ground-water/surface-water flow in the Santa Clara-Calleguas ground-water basin, Ventura County, California*, U.S. Geological Survey, USGS Water Resources Investigations Report 02-4136.

Izbicki, J.A., 1991. *Chloride sources in a California coastal aquifer*: American Society of Civil Engineers, 1991 Symposium on Ground Water in the Pacific Rim, Honolulu, Hawaii, July 22-26, 1991, Proceedings, p.71-77.

Izbicki, J.A., 1992. *Sources of chloride in ground water of the Oxnard Plain, California*, in Prince K.R. and Johnson, A.I., eds., Regional aquifer systems of the United States—Aquifers of the Far West: American Water Resources Association Monograph Series, no.16, p.5-14.

Izbicki, J.A., Michel, R.L., and P. Martin, 1992. *Tritium and carbon-14 as tracers of ground-water recharge*: Irrigation & Drainage Session Proceedings/Water Forum '92, ASCE, Baltimore, MD, p.122-127.

Izbicki, J.A., P. Martin, Densmore, J.N. and Clark, D.A., 1995. *Water-quality data for the Santa Clara-Calleguas hydrologic unit, Ventura County, California, October 1989 through December 1993*: U.S. Geological Survey Open-File Report 95-315, 124p.

Izbicki, J.A., 1996a, *Seawater Intrusion in a Coastal California Aquifer,* United States Geologic Survey Fact Sheet 125-96.

Izbicki, J.A., 1996b. *Source, Movement, and Age of Ground Water in a Coastal California Aquifer,* United States Geologic Survey Fact Sheet 126-96.

Izbicki, J.A., Christensen, A.H., Newhouse, M.W., and Aiken, G.R., 2005. *Inorganic, isotopic, and organic composition of high-chloride water from wells in a coastal southern California aquifer*, Applied Geochemistry 20, p.1496-1517.

Mann, J.F., Jr., 1959, *A plan for ground water management, United Water Conservation District*: Report to United Water Conservation District, 120p.

Mukae, M.M. and Turner, J.M., 1975. Ventura County water resources management study – geologic formations, structures and history in the Santa Clara-Calleguas area, *in* Compilation of Technical Information Records for the Ventura County Cooperative Investigation: California Department of Water Resources, v.1.

Stamos, C.L., Predmore, S.K., and Zohdy, A.A.R., 1992. *Use of D-C resistivity to map saline ground water*: American Society of Civil Engineers National Conference, Water Forum 1992, Baltimore, Maryland, August 2-6, 1992, Proceedings, p.80-85.

Turner, J.M., 1975. *Aquifer delineation in the Oxnard-Calleguas area, Ventura County*, *in* Compilation of Technical Information Records for the Ventura County Cooperative Investigation: California Department of Water Resources, 28p.

Turner, J.M., and Mukae, M.M., 1975. *Ventura County Water Resources Management Study - Effective Base of Fresh Water Reservoir in the Oxnard-Calleguas Area*, Ventura County Department of Public Works Flood Control District, 14p.

United Water Conservation District, 1998. *Nitrate study of El Rio area Phase I*: Report to United Water Conservation District, 17p.

United Water Conservation District, 2001. *Conjunctive use alternatives for overdraft reduction in the Oxnard Plain and Pleasant Valley*: Report to United Water Conservation District, 36p.

United Water Conservation District, 2002. *Agricultural efficiency*, Presentation to UWCD and Association of Water Agencies of Ventura County.

United Water Conservation District, 2003. *Coastal Saline Intrusion*, Report to United Water Conservation District, 32p.

United Water Conservation District, 2006a. *Annual Groundwater Conditions Report*, 19p.

United Water Conservation District, 2006b. *Update of the Ventura Regional Groundwater Model*.

U.S. Bureau of Reclamation, 1975. *Ventura County water management project working document*, Sacramento, CA, 211p.

Ventura County Public Works Agency, 1985. *Task 86-3 Groundwater management plan for the Fox Canyon Groundwater Management Agency*.

Ventura County Watershed Protection District, 2006. *Inventory of Public and Private Water Purveyors of Ventura County*, County of Ventura, California, 342 p.

Zohdy A.A.R., Martin, Peter, and Bisdorf, B.J., 1993. *A study of seawater intrusion using direct-current soundings in the southeastern part of the Oxnard Plain, California*: U.S. Geological Survey Open-File Report 93-524, 138p.

A 1.0 APPENDIX A - PROGRESSION OF SEAWATER INTRUSION BENEATH THE SOUTH OXNARD PLAIN

Although seawater intrusion under the Oxnard Plain has been studied over several decades, the details of the intrusion have not been analyzed until recently when United Water Conservation District (UWCD) entered all historic data on water levels, water quality, and well construction into digital databases and GIS coverages so the entire data set could be analyzed systematically. This new analysis uses all this digital information to construct a series of maps depicting groundwater levels and chloride concentrations in wells within the south Oxnard Plain from as far back as 1920. The analysis used 5-year time slices in both the Lower Aquifer System and Upper Aquifer System to determine when groundwater levels first dropped below sea level, when chloride levels first increased as a result of the landward gradient caused by these lowered groundwater levels, and the progression of saline water since that time.

Saline intrusion is recognized in monitoring wells by concentrations of chloride and Total Dissolved Solids (TDS) that are several times higher than the Basin Plan Objectives of 150 mg/L and 1,200 mg/L, respectively. In practice, the leading edge of the intrusion is mapped on the Oxnard Plain as the first occurrence of chloride in excess of 500 mg/L., which is used in the following set of maps.

Groundwater levels first dropped below sea level in the period 1945-49 in the Upper Aquifer System (Figure 34), although groundwater levels were scarce at the coastline for some years prior to that time. In the following 5-year time slice of 1950-54 (Figure 35), groundwater levels dropped below sea level across much of the south Oxnard Plain, and chlorides increased to as much as 1,925 mg/L at the Port Hueneme coastline. Thus, the apparent time lag between groundwater dropping below sea level and the encroachment of seawater was somewhere in the range of 5 to 10 years. In the following 5-year time slice of 1955-59, chlorides increased rapidly in coastal wells, reaching as high as 27,350 mg/L (Figure 36).

Although a few sampled wells may have had corroded casings that allowed poorer-quality perched water to flow into the well, most of the early chloride readings were taken from pumping wells with a smaller chance of significant cross-contamination during sampling (groundwater flowing into pumping wells would likely come mostly from screened intervals in the well). Outliers of wells with poorer quality water were not considered in the interpretation of the areas of saline intrusion to minimize random instances of cross-contamination; it was only concentrations of wells with poor quality water that were considered as significant. Within the first 20 years of intrusion, higher chloride levels were evident up to 3 miles inland from the area of initial intrusion, an intrusion rate of about 800 feet per year. This rate of intrusion is similar to rates calculated for seawater intrusion in the Salinas groundwater basin (e.g., CDWR, 1973).

The intrusion of the Upper Aquifer System in the Port Hueneme area was temporarily arrested during the mid 1980s following a wet climatic cycle (e.g., Figure 42). As the new FCGMA policies, the Freeman Diversion, and the PTP Pipeline came online, chloride levels in the Port Hueneme saline lobe in the Upper Aquifer System continued to decrease, with chloride concentrations in some wells near the coastline returning to drinking-water quality. However, chloride levels remain high in smaller lobes centered around both Port Hueneme Harbor and Mugu Lagoon (Figure 44). Unfortunately, some of the saline water intruded around Port Hueneme did not exit via the canyon when high water levels return. Unquantified amounts of saline water were transported to the southeast along the coast by the prevailing (non-drought period) groundwater gradient.

Intrusion in the Lower Aquifer System lagged considerably in time behind the Upper Aquifer System. Groundwater levels near the coastline first went below sea level in the 1955-59 time period (Figure 48), but high chlorides were not detected until the 1985-89 time period at Port Hueneme and the 1990-94 time period near Point Mugu (Figure 52, Figure 53), some 30 years later. This time lag is partially caused by the longer travel time for seawater intruded from the Lower Aquifer System outcrops along the offshore Hueneme Submarine Canyon walls and partially the result of the lack of monitoring points right at the coastline until the USGS monitoring wells were drilled in the late 1980s and early 1990s. As discussed in section 5.0 *Water Quality Issues*, the U.S. Geological Survey interpretation is that the majority of the saline intrusion in the Lower Aquifer System near Point Mugu is saline water being pulled from surrounding sediments rather than from the ocean itself (see Figure 56).

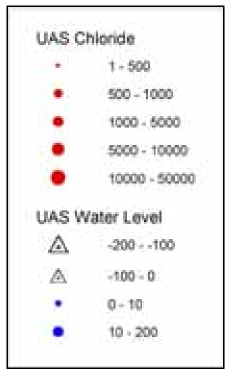


Figure 29. Legend for Figure 30 to Figure 44 for Upper Aquifer System time slices. Chloride concentrations are in mg/L, water level is elevation above or below mean sea level. All maps are oriented with north to the top of the page. Area of map coincides with location map in Figure 2 in section 2.0 *Background of Groundwater Management and Overdraft Within the FCGMA.*

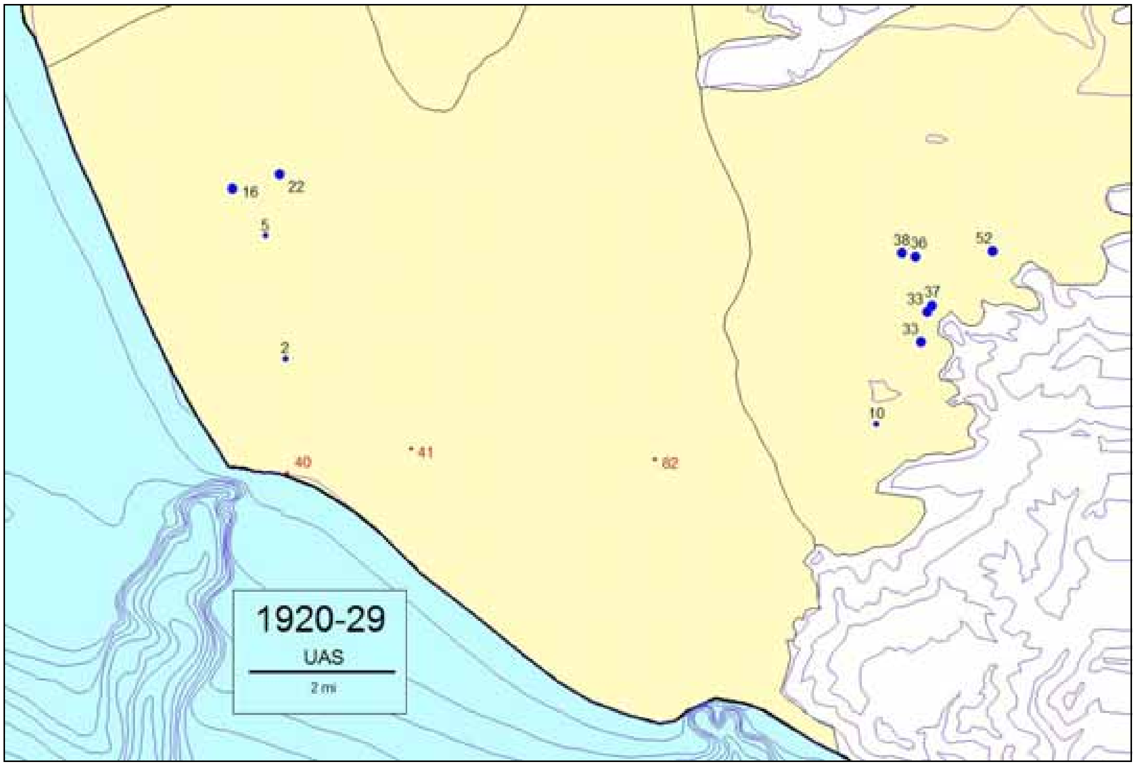


Figure 30. Upper Aquifer System groundwater levels and chloride levels, 1920 to 1929. Legend is shown in Figure 29. Line in title block is two miles in length.

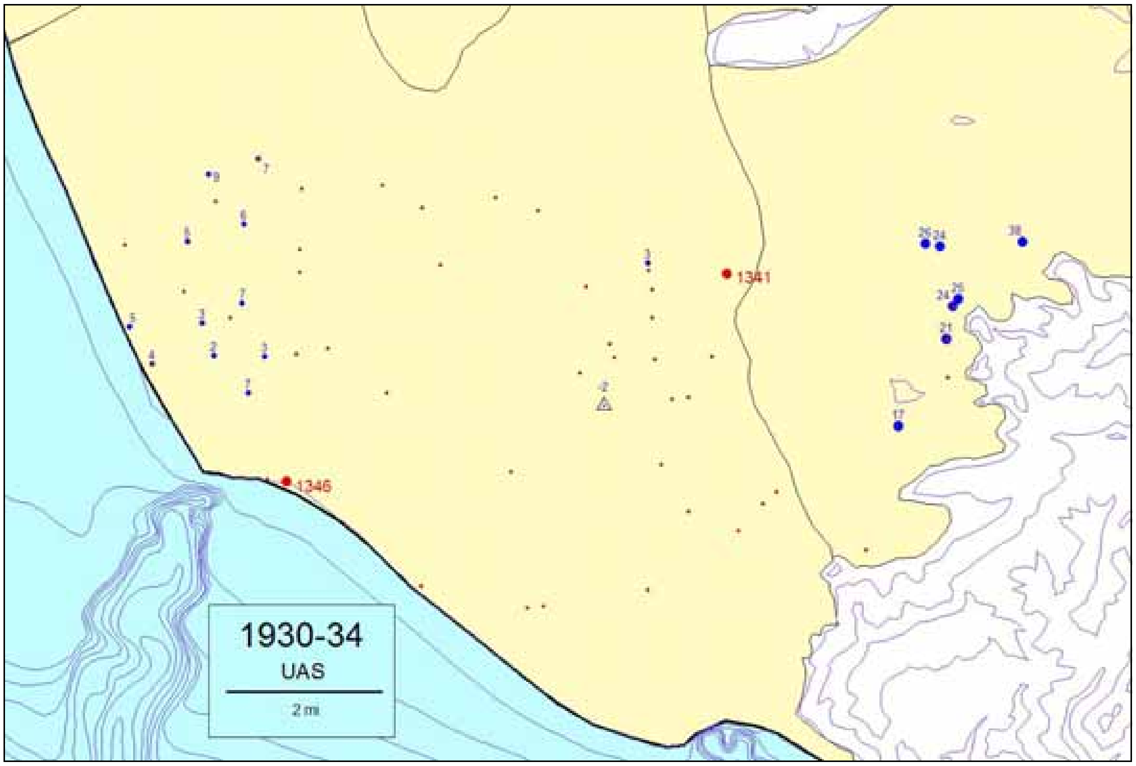


Figure 31. Upper Aquifer System groundwater levels and chloride levels, 1930 to 1934. Legend is shown in Figure 29. Line in title block is two miles in length.

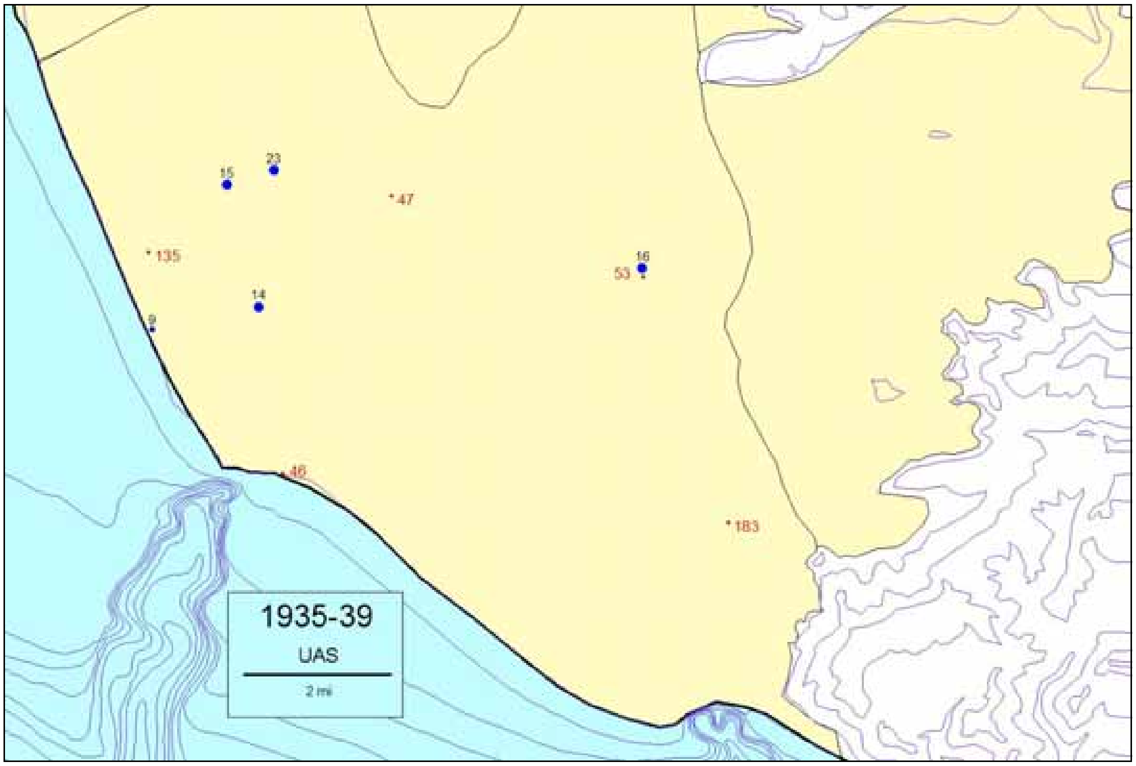


Figure 32. Upper Aquifer System groundwater levels and chloride levels, 1935 to 1939. Legend is shown in Figure 29. Line in title block is two miles in length.

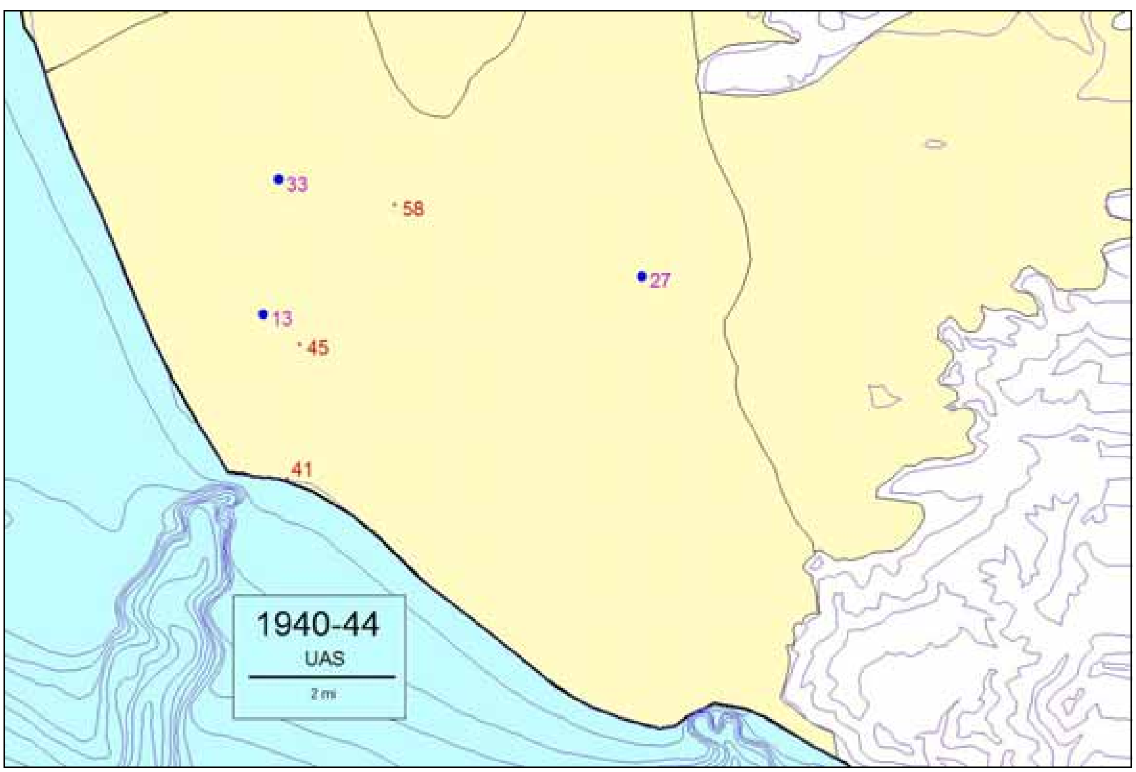


Figure 33. Upper Aquifer System groundwater levels and chloride levels, 1940 to 1944. Legend is shown in Figure 29. Line in title block is two miles in length.

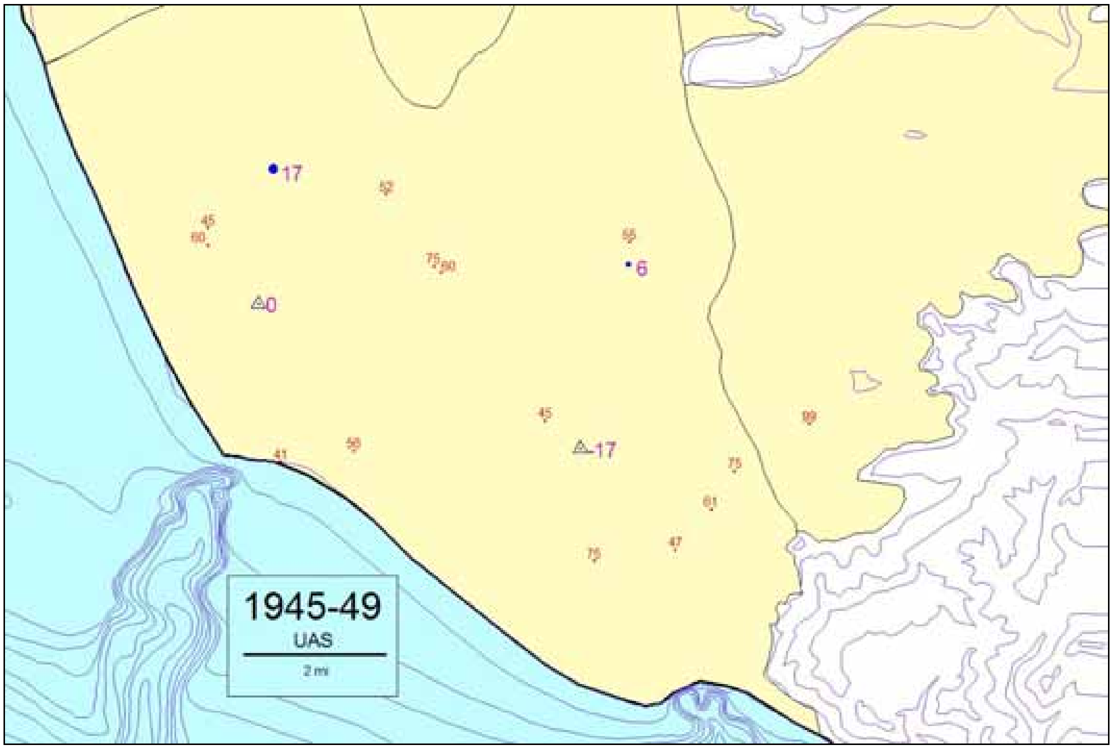


Figure 34. Upper Aquifer System groundwater levels and chloride levels, 1945 to 1949. Legend is shown in Figure 29. Line in title block is two miles in length.

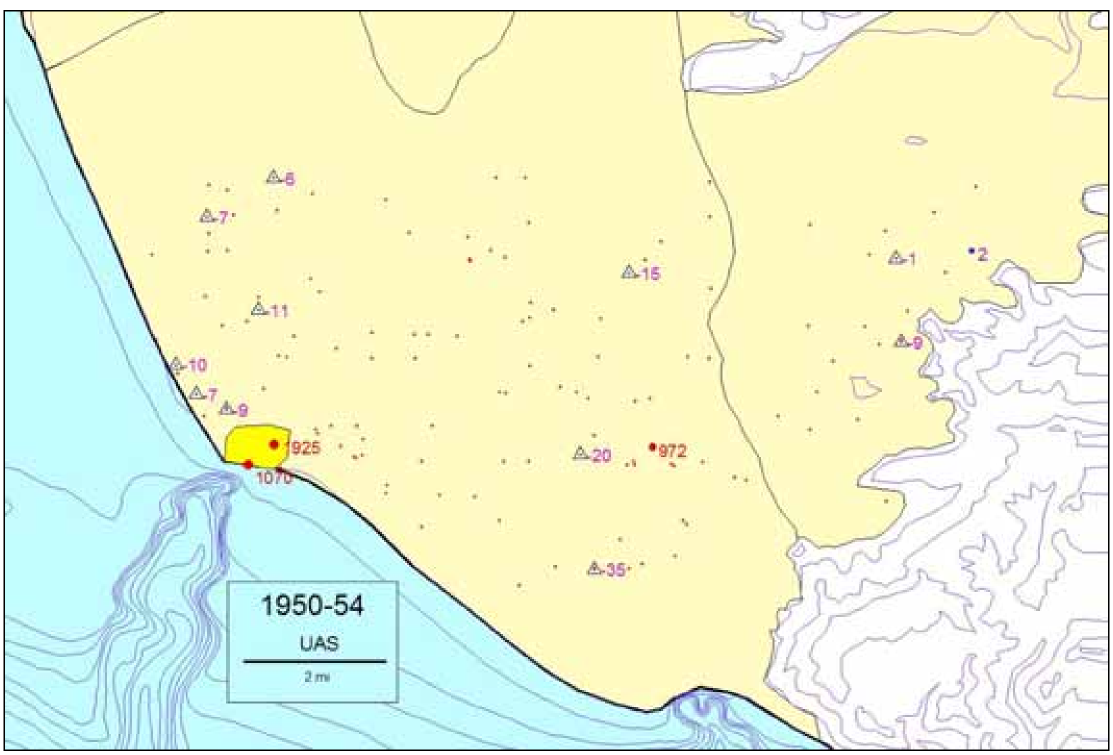


Figure 35. Upper Aquifer System groundwater levels and chloride levels, 1950 to 1954. Legend is shown in Figure 29. Bright yellow area is intruded by seawater near Hueneme Submarine Canyon. Line in title block is two miles in length.

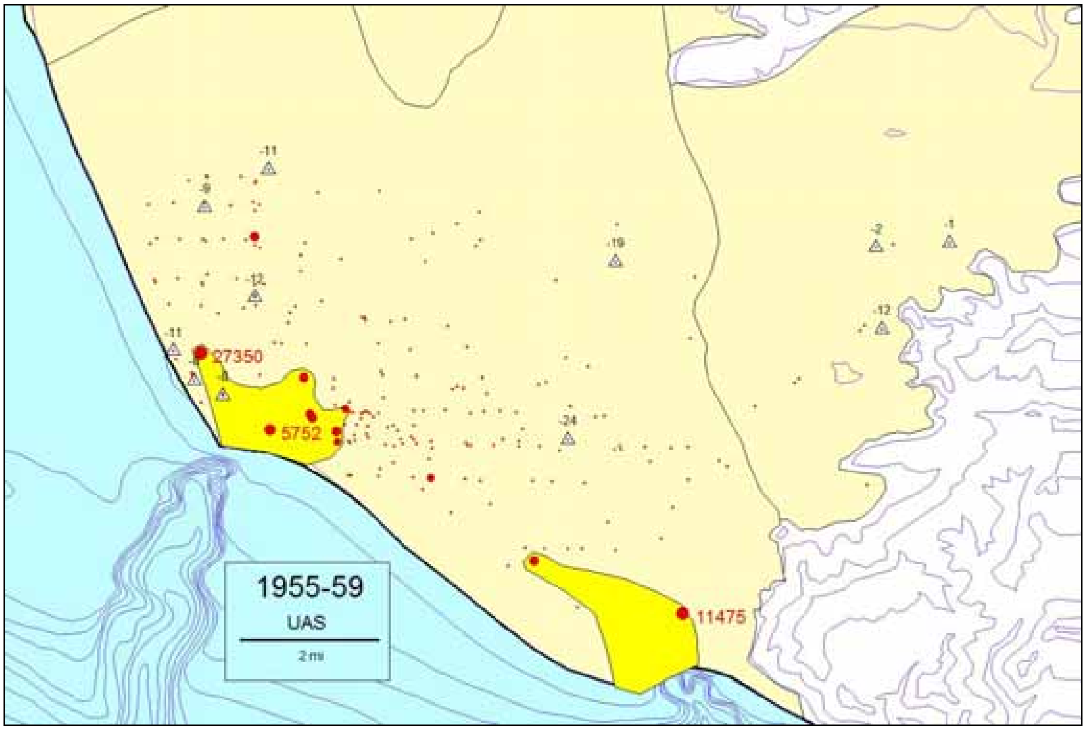


Figure 36. Upper Aquifer System groundwater levels and chloride levels, 1955 to 1959. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

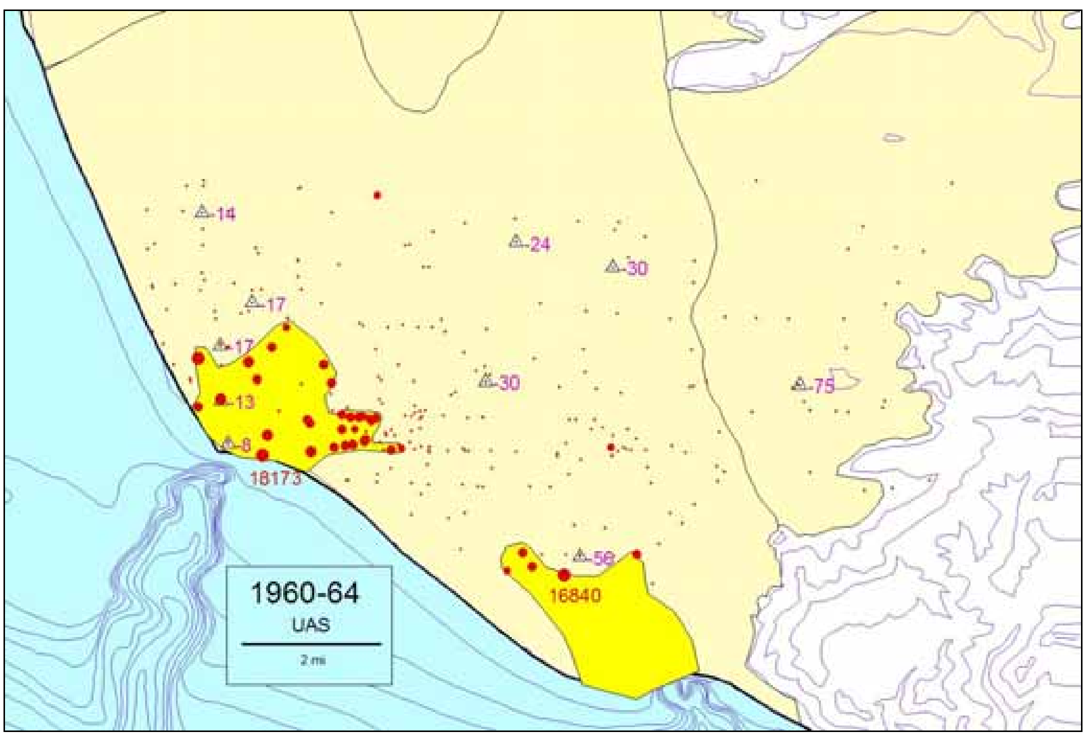


Figure 37. Upper Aquifer System groundwater levels and chloride levels, 1960 to 1964. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

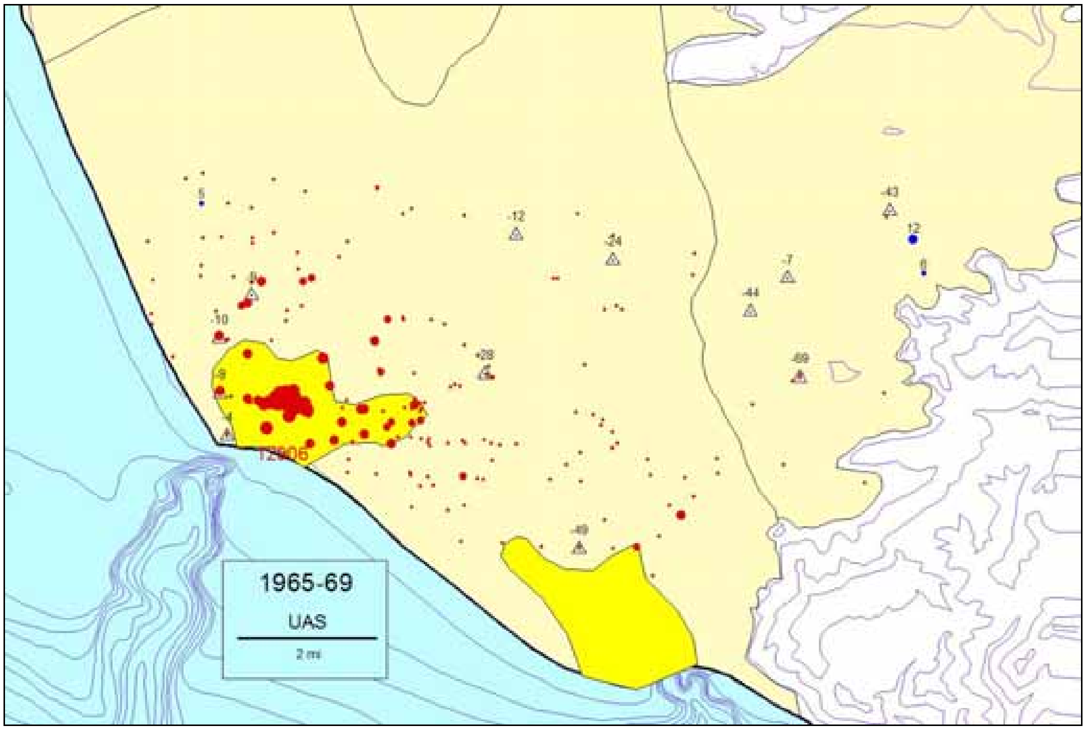


Figure 38. Upper Aquifer System groundwater levels and chloride levels, 1965 to 1969. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

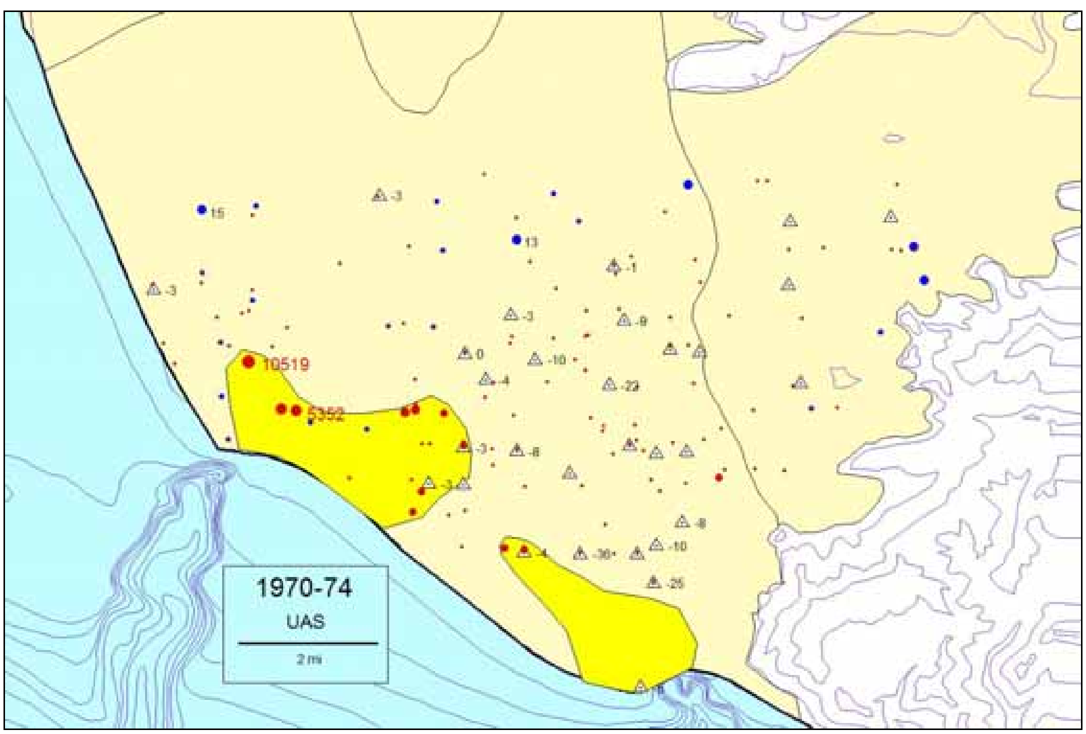


Figure 39. Upper Aquifer System groundwater levels and chloride levels, 1970 to 1974. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

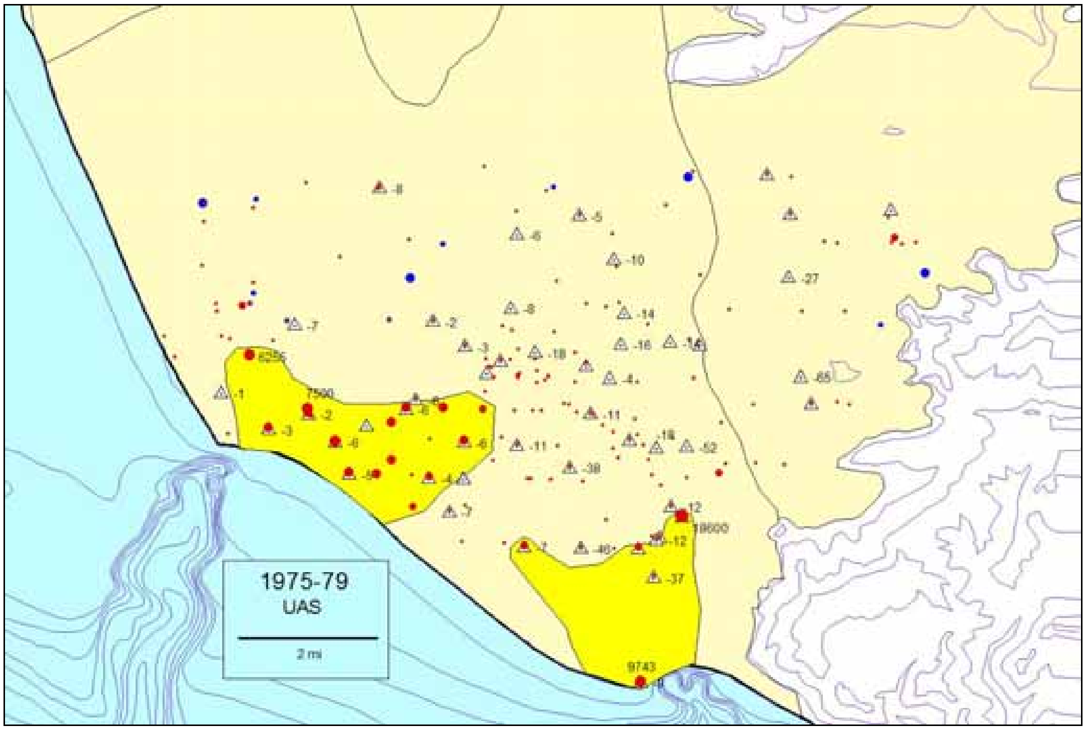


Figure 40. Upper Aquifer System groundwater levels and chloride levels, 1975 to 1979. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

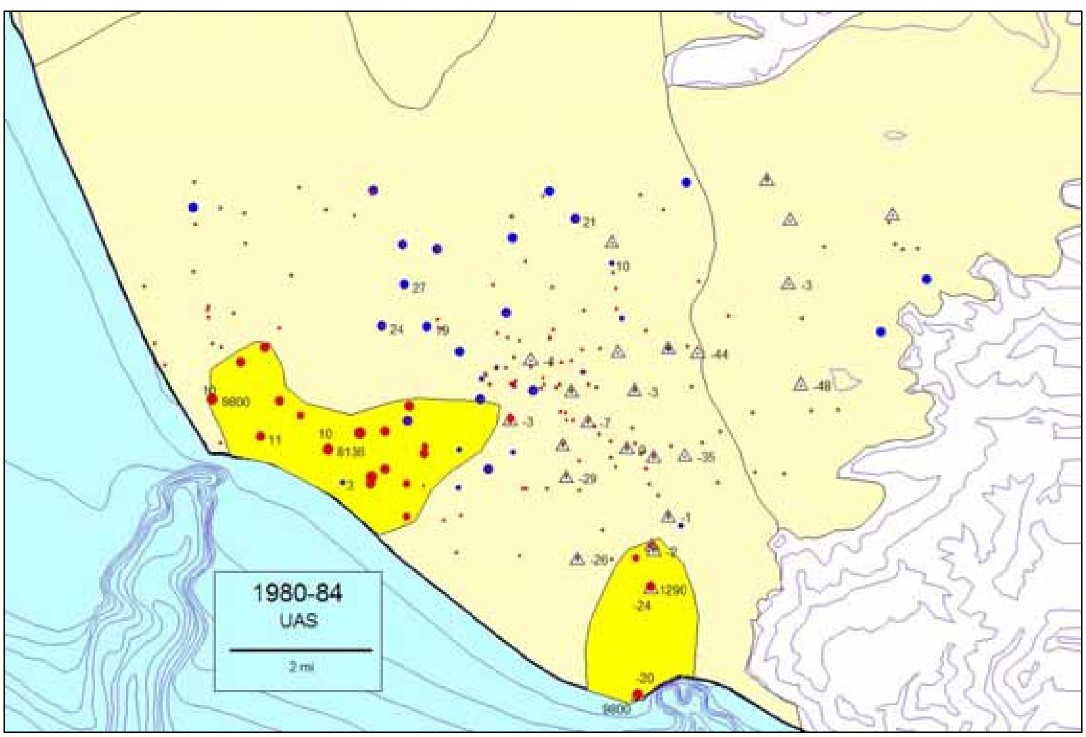


Figure 41. Upper Aquifer System groundwater levels and chloride levels, 1980 to 1984. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

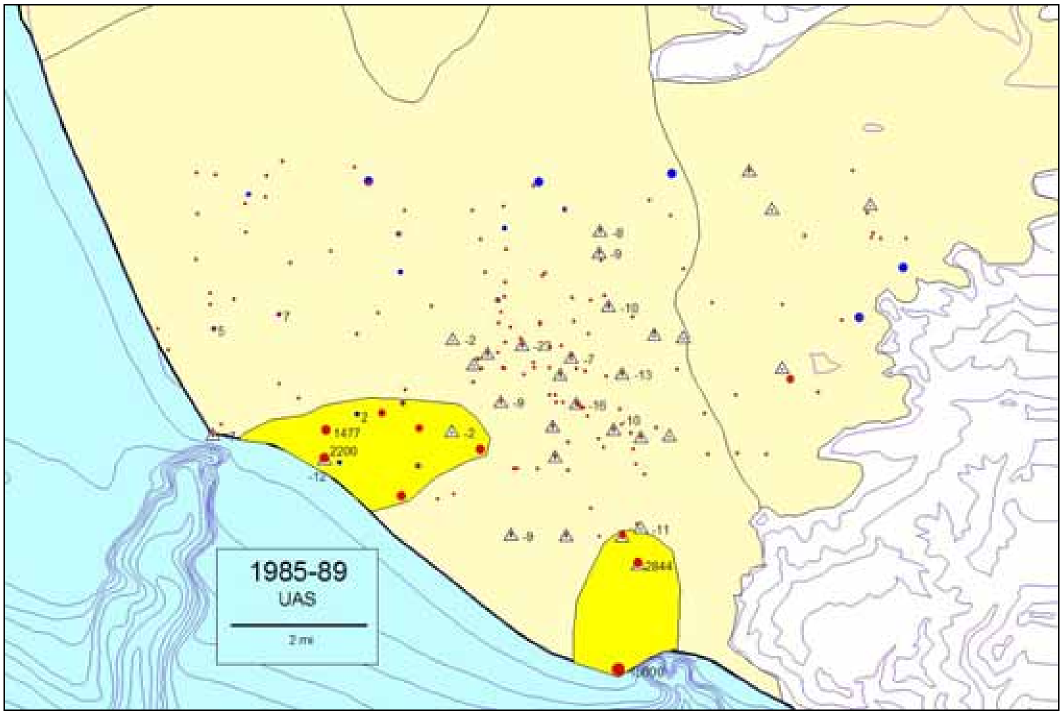


Figure 42. Upper Aquifer System groundwater levels and chloride levels, 1985 to 1989. Legend is shown in Figure 29. Bright yellow areas are intruded by saline waters. Line in title block is two miles in length.

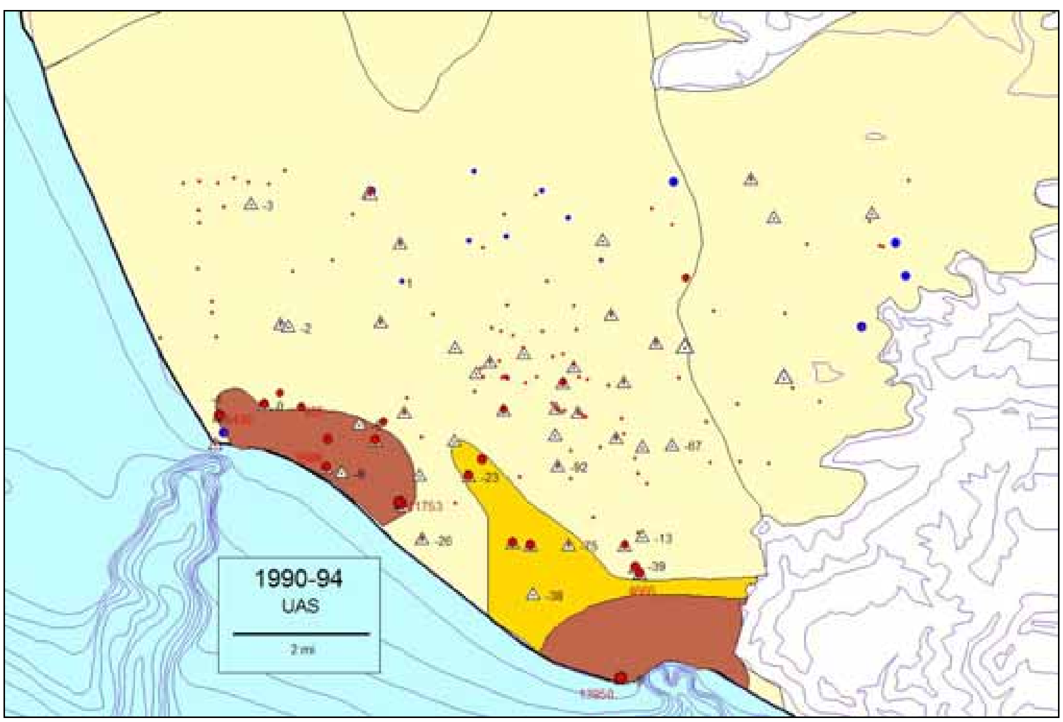


Figure 43. Upper Aquifer System groundwater levels and chloride levels, 1990 to 1994. Legend is shown in Figure 29. Source of saline intruded areas: reddish brown is from seawater; yellow-orange is from sediments. Line in title block is two miles in length.

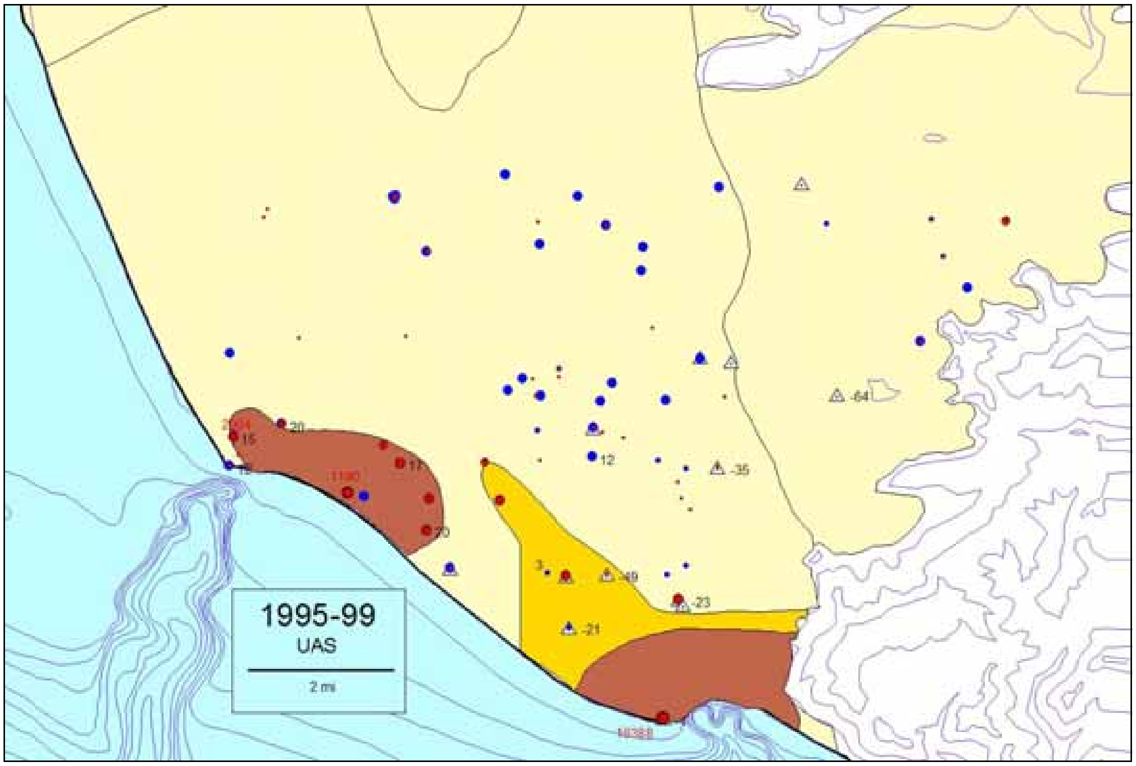


Figure 44 Upper Aquifer System groundwater levels and chloride levels, 1995 to 1999. Legend is shown in Figure 29. Source of saline intruded areas: reddish brown is from seawater; yellow-orange is from sediments. Line in title block is two miles in length.

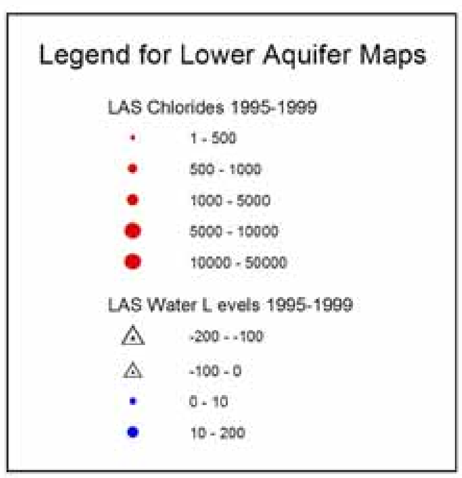


Figure 45. Legend for Figure 46 to Figure 56 for Lower Aquifer System time slices. Chloride concentrations are in mg/L, water level is elevation above or below mean sea level. All maps are

oriented with north to the top of the page. Area of map coincides with location map in Figure 2 in section 2.0 *Background of Groundwater Management and Overdraft Within the FCGMA*.

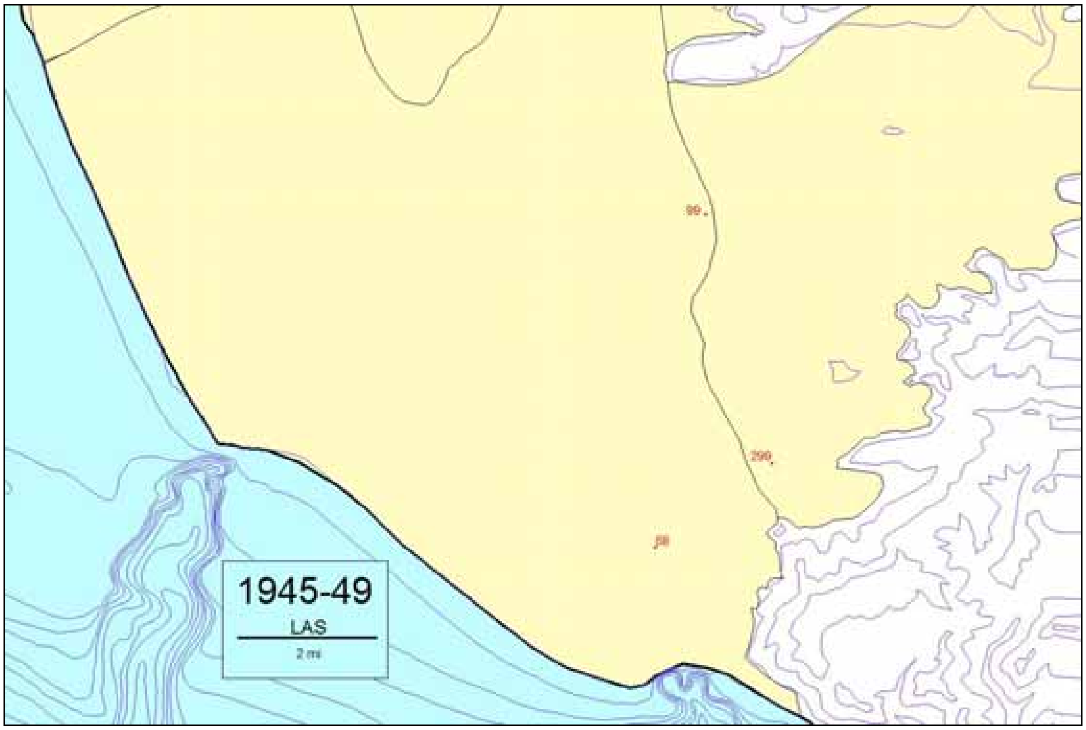


Figure 46. Lower Aquifer System groundwater levels and chloride levels, 1945 to 1949. Legend is shown in Figure 45. Line in title block is two miles in length.

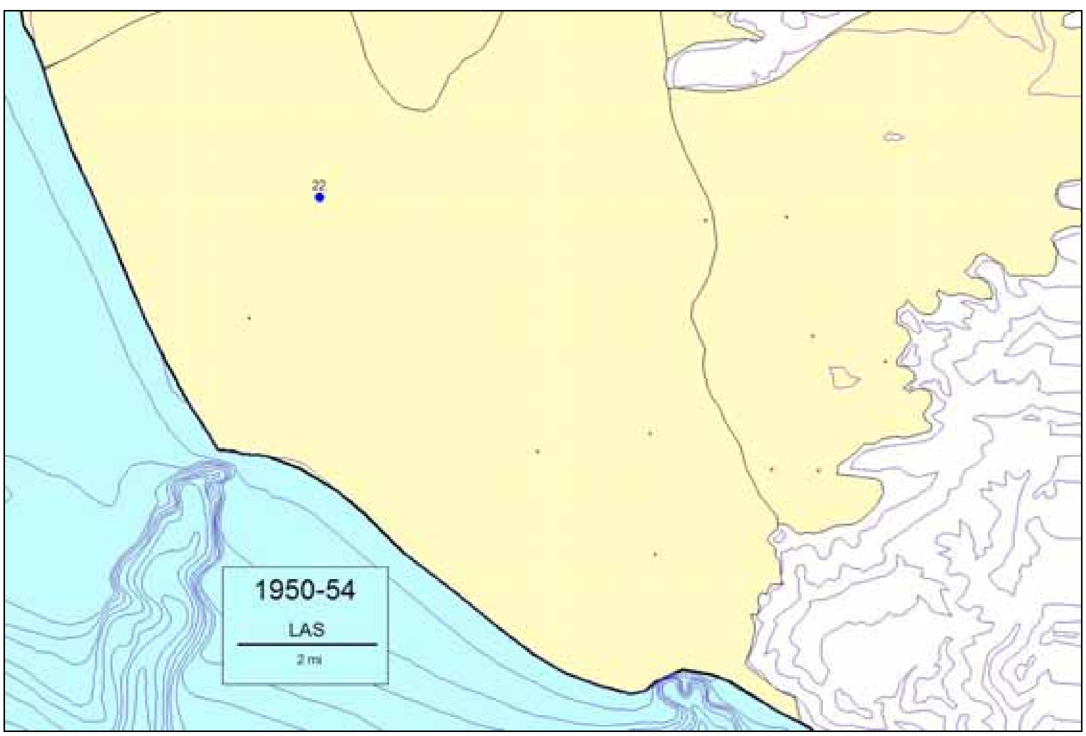


Figure 47. Lower Aquifer System groundwater levels and chloride levels, 1950 to 1954. Legend is shown in Figure 45. Line in title block is two miles in length.

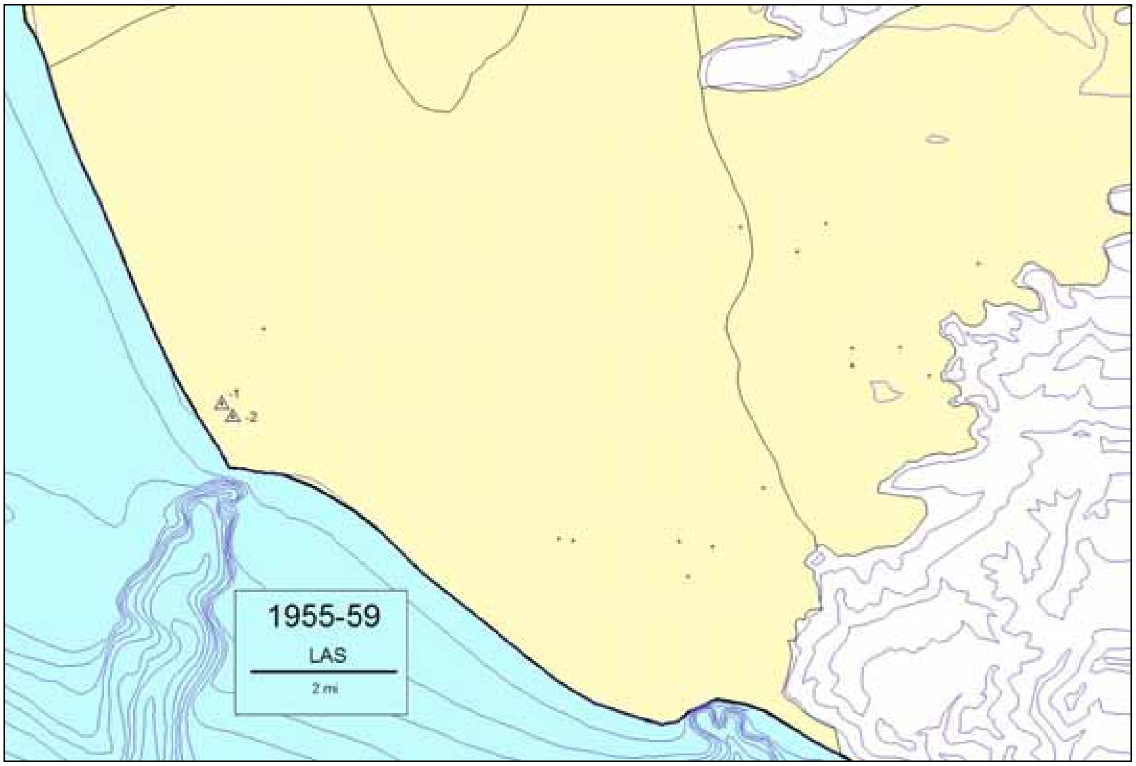


Figure 48. Lower Aquifer System groundwater levels and chloride levels, 1955 to 1959. Legend is shown in Figure 45. Line in title block is two miles in length.

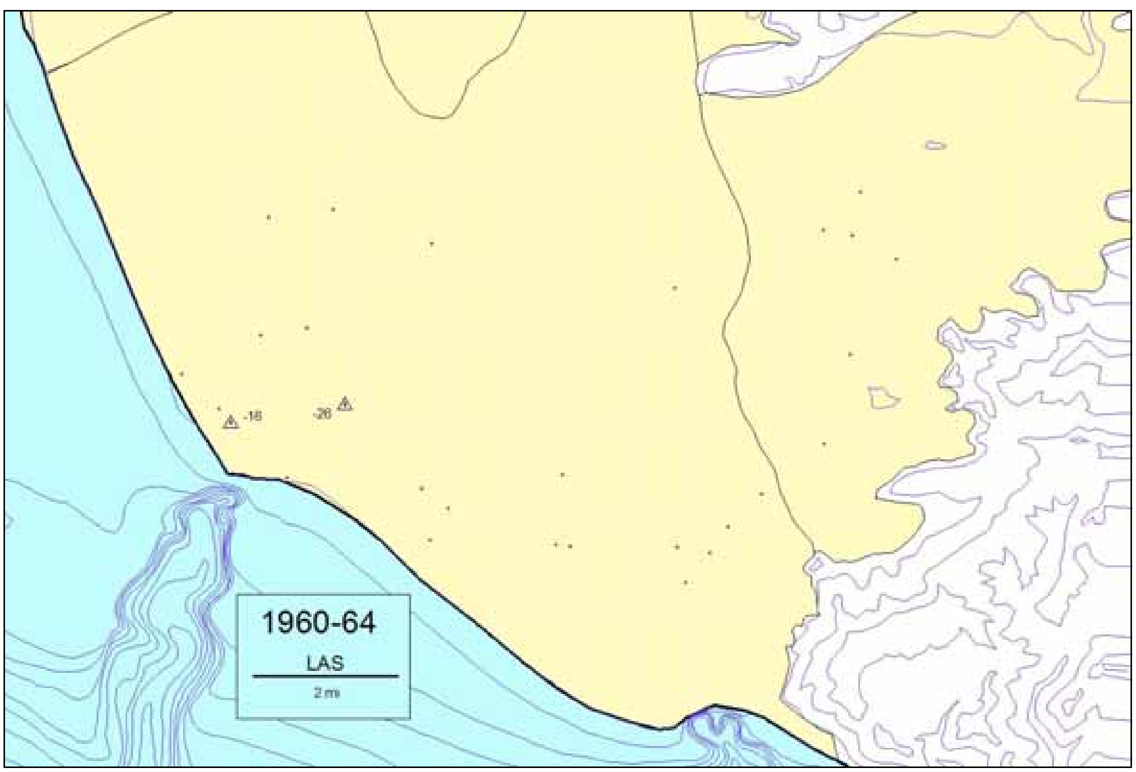


Figure 49. Lower Aquifer System groundwater levels and chloride levels, 1960 to 1964. Legend is shown in Figure 45. Line in title block is two miles in length.

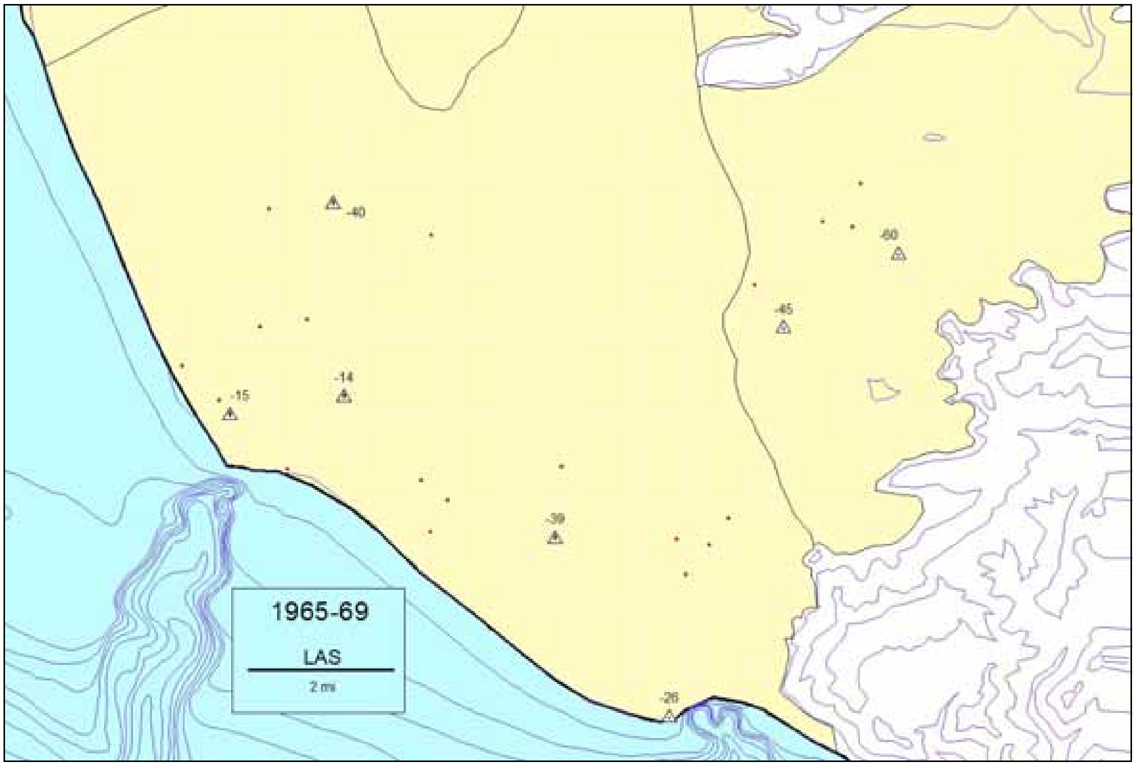


Figure 50. Lower Aquifer System groundwater levels and chloride levels, 1965 to 1969. Legend is shown in Figure 45. Line in title block is two miles in length.

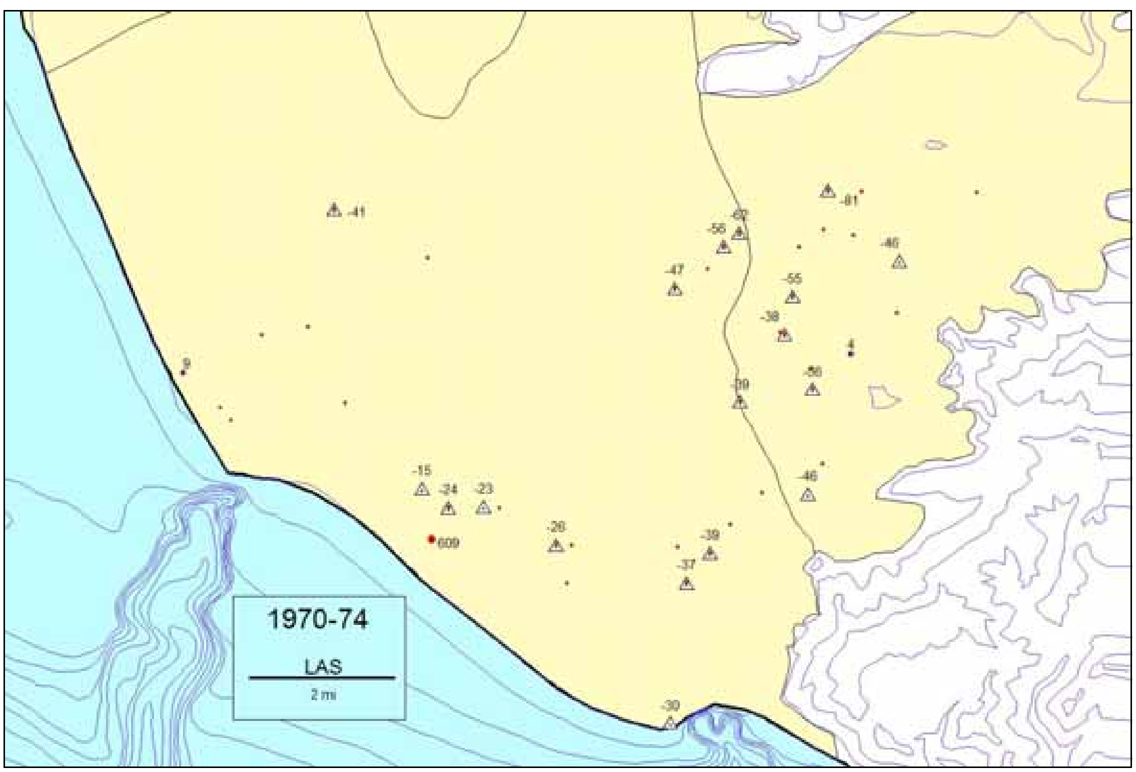


Figure 51. Lower Aquifer System groundwater levels and chloride levels, 1970 to 1974. Legend is shown in Figure 45. Line in title block is two miles in length.

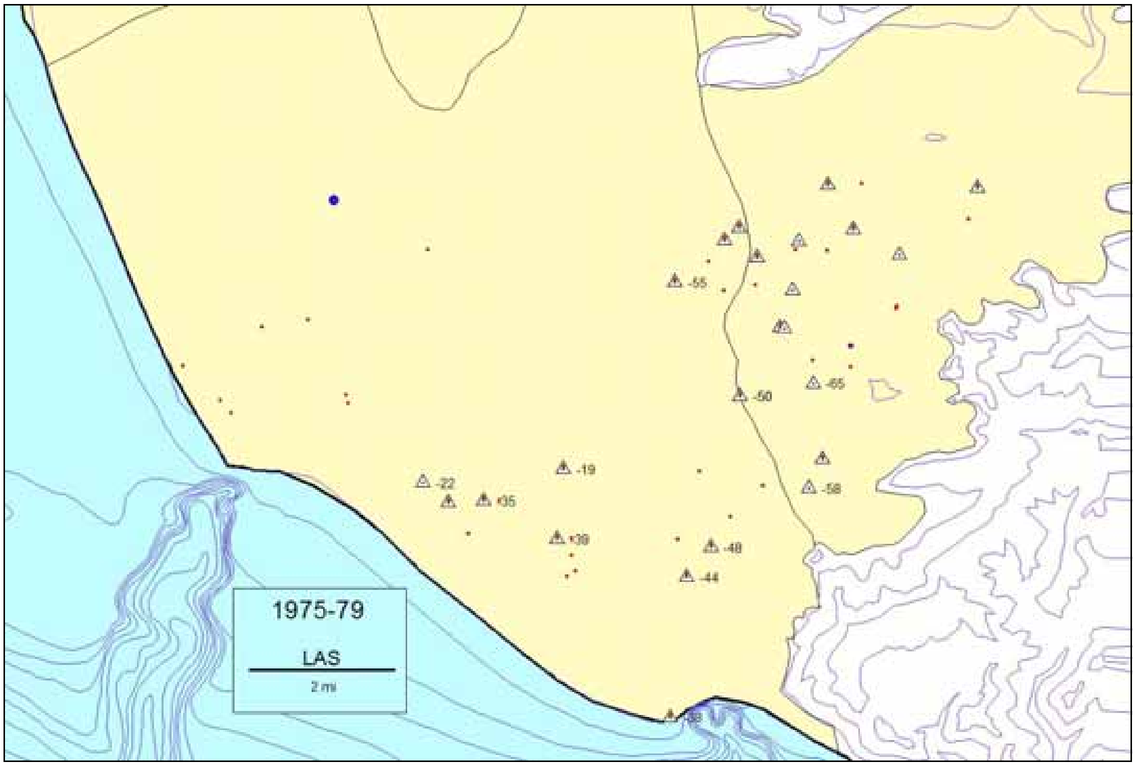


Figure 52. Lower Aquifer System groundwater levels and chloride levels, 1975 to 1979. Legend is shown in Figure 45. Line in title block is two miles in length.

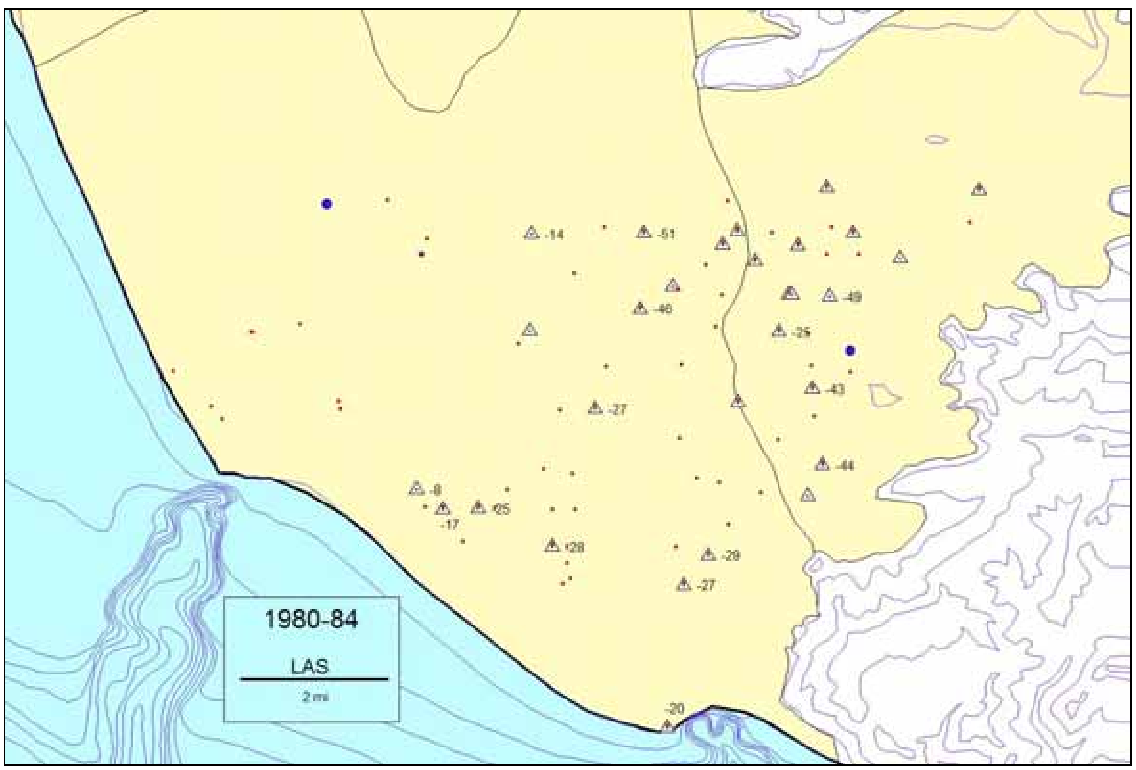


Figure 53. Lower Aquifer System groundwater levels and chloride levels, 1980 to 1984. Legend is shown in Figure 45. Line in title block is two miles in length.

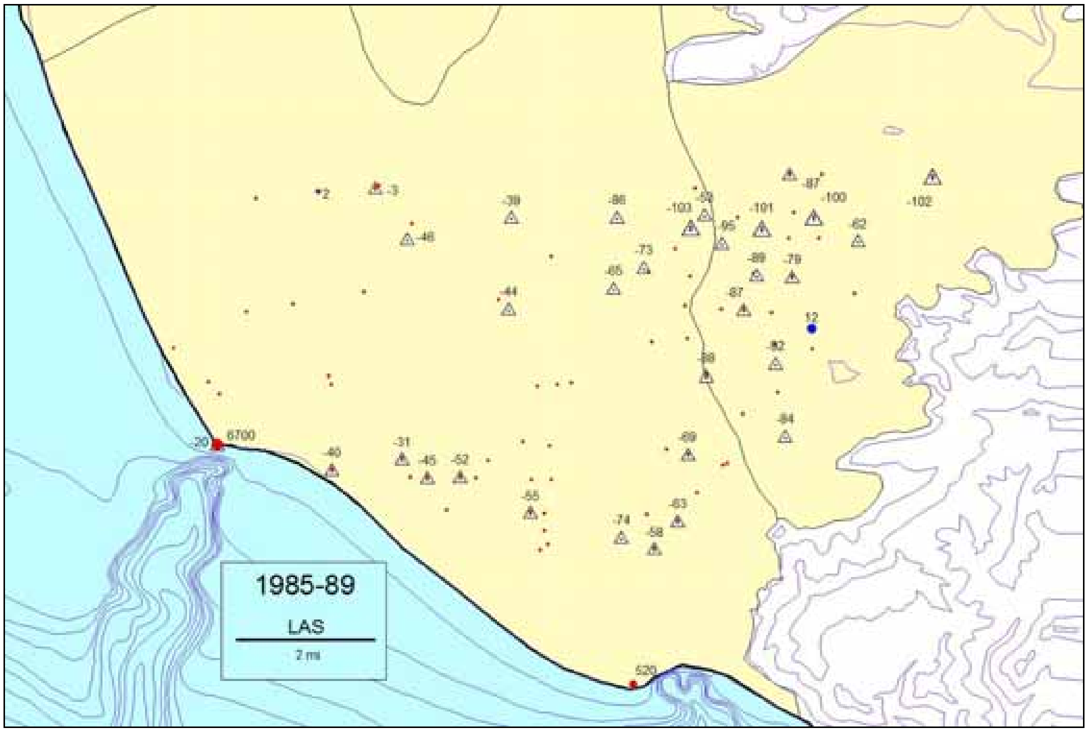


Figure 54. Lower Aquifer System groundwater levels and chloride levels, 1985 to 1989. Legend is shown in Figure 45. Note start of seawater intrusion (red dot) at head of Hueneme Submarine Canyon. Line in title block is two miles in length.

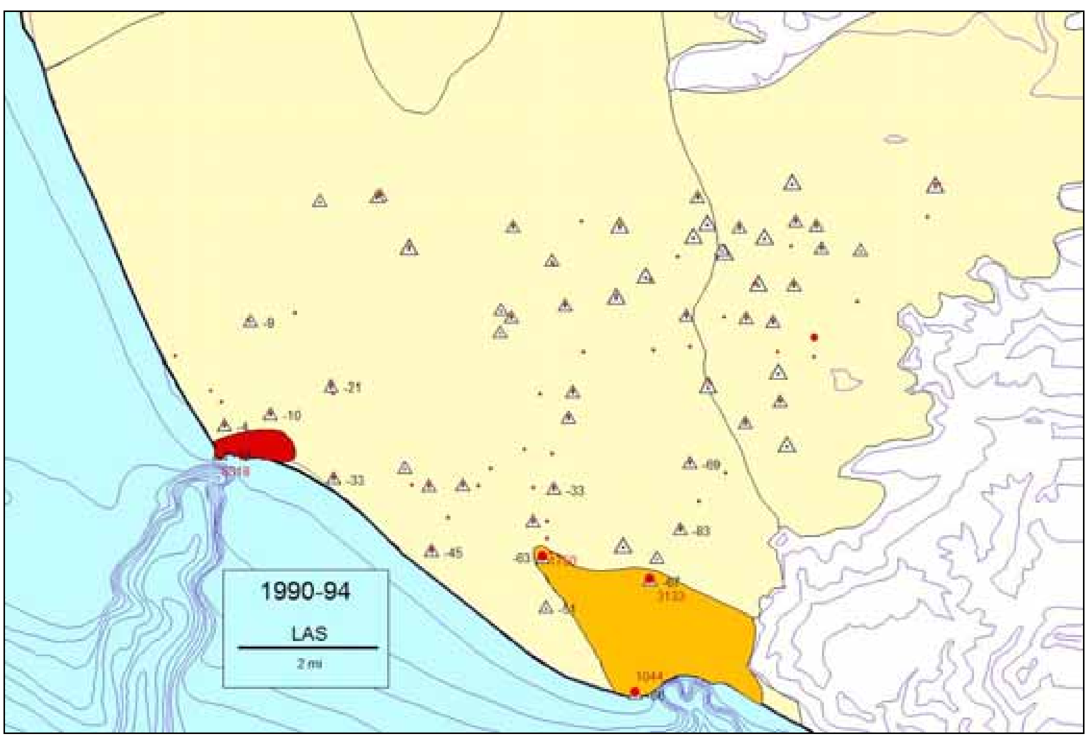


Figure 55. Lower Aquifer System groundwater levels and chloride levels, 1990 to 1994. Legend is shown in Figure 45. Source of saline intruded areas: reddish brown is from seawater; yellow-orange is from sediments. Line in title block is two miles in length.

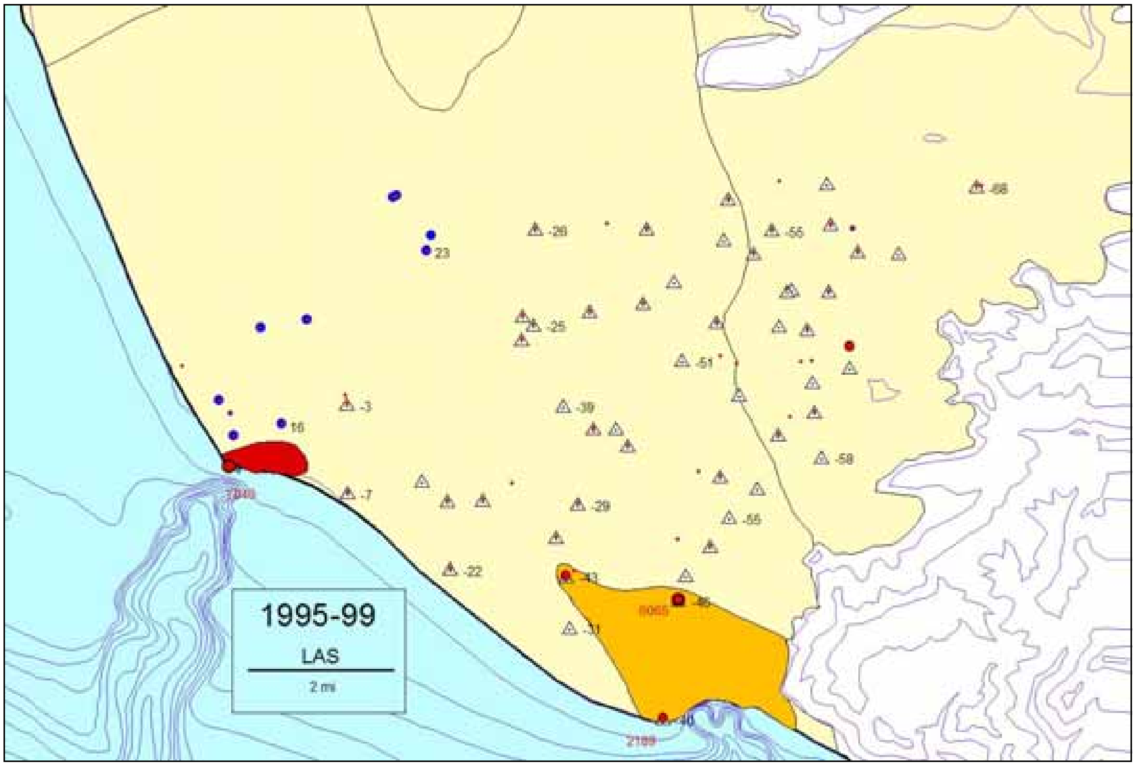


Figure 56. Lower Aquifer System groundwater levels and chloride levels, 1995 to 1999. Legend is shown in Figure 45. Source of saline intruded areas: reddish brown is from seawater; yellow-orange is from sediments. Line in title block is two miles in length.

A2.0 APPENDIX B. - VENTURA REGIONAL GROUNDWATER MODEL

A2.1 INTRODUCTION

The Ventura Regional Groundwater Model is a tool developed to evaluate multifaceted conjunctive use groundwater management projects designed to alleviate seawater intrusion, overdraft, land subsidence and other problems. These projects include in-lieu use of surface water, shifts in pumping and waste water effluent recycling.

The regional groundwater flow model was originally developed by the U.S. Geological Survey (Hanson et al., 2003) as part of the Regional Aquifer Systems Analysis (RASA), jointly funded by United Water Conservation District and Ventura County Water Resources.

The model is a finite difference numerical model which uses the MODFLOW code. The USGS developed an historical model from 1891 to 1993 and a forward model based on 1970 to 1993 hydrology. The original 2 layer model (Upper Aquifer System and Lower

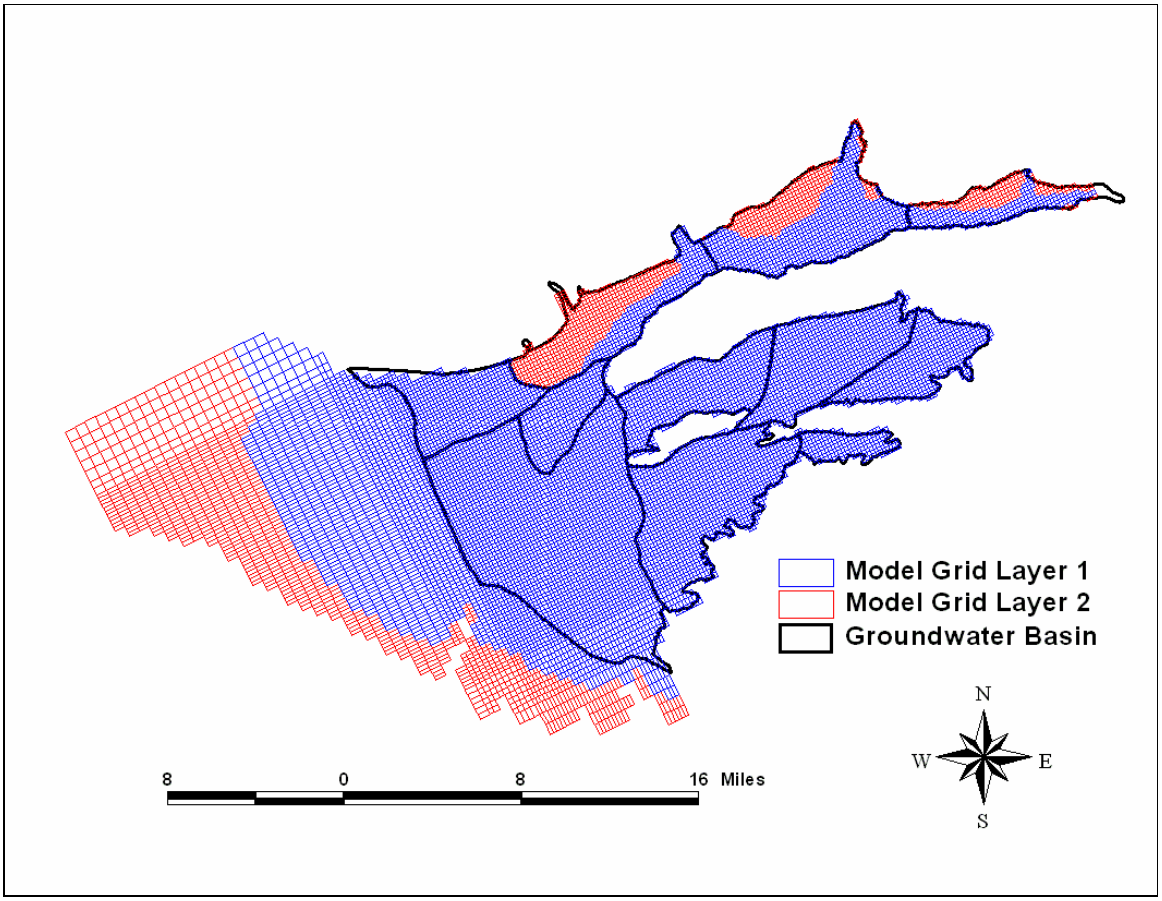


Figure 57. Updated model grid for Ventura Regional Groundwater Model.

Aquifer System) consists of a grid that contains 60 rows and 110 columns for a total of 6,600 cells (Figure 57). Within each cell a groundwater level can be computed. Volume amounts of flow can be computed from cell to cell, basin to basin and from layer to layer. The groundwater basins within the model include Piru, Fillmore, Santa Paula, Mound, Oxnard Plain Forebay, Oxnard Plain, Pleasant Valley, East Las Posas, West Las Posas, South Las Posas, and Santa Rosa.

Water resource inputs to the model include stream flow, artificial recharge, onshore flow, effluent recharge, recharge on permeable mountain front outcrops, rainfall infiltration on the valley floor, and groundwater storage within the permeable sand and gravel aquifers. Water resource outputs include offshore flow and pumping.

The United Water Conservation District has recently modified the groundwater model. The modifications include the following:

- Model was put on user friendly *Groundwater Vistas* platform. This eliminates having to run the model in DOS.
- Refinement of cell size from 1/2 mile x 1/2 mile to 1/6 mile x 1/6 mile for the alluvial basins. This, for example, enables the artificial recharge water to more accurately be input to the appropriate area instead of overlapping into the river.
- Reduction in grid size. In the original USGS model only 28% of the grid cells are active. In the modified model 47% of grid cells are active (ETIC, 2003).
- Extension of the historical and forward model to include 1994 to 2000 hydrology.
- Addition of a zone of lower hydraulic conductivity in the Lower Aquifer System extending in a linear trend from the Camarillo Hills anti-cline to Port Hueneme. This is to simulate the maximum uplift and truncation of the more permeable upper portion of the Lower Aquifer System along this linear trend.
- Addition of an additional layer in the upper basins of Piru, Fillmore, and Santa Paula to better simulate the more permeable alluvium along the Santa Clara River, Sespe Creek, Santa Paula Creek and Piru Creek.
- Recalibration of the Forebay and Oxnard Plain portions of the model over the period 1983 to 1998 to reflect the increased diversions and recharge that have occurred in this area since the USGS originally calibrated the model (UWCD, 2006b).
- Expansion of the forward model period to a full 55 years that reflect the climate and hydrology of the years 1944 to 1998. This period is a commonly-used base period because it starts and ends in very wet years, spans several wet and dry cycles, and represents zero cumulative departure for rainfall across the period.

The regional groundwater flow model has been used in the following projects and analyses:

- Oxnard Plain LAS and UAS overdraft analysis – UWCD (2001)
- GREAT Project EIR – UWCD and City of Oxnard
- Las Posas Basin ASR project operations – Calleguas MWD
- City of Fillmore water supply planning – UWCD and City of Fillmore
- Pleasant Valley AB303 grant study – UWCD
- Fox Canyon Groundwater Management Agency Groundwater Management Plan – UWCD and FCGMA

A2.2 MODELING FOR THE FCGMA GROUNDWATER MANAGEMENT PLAN

The Ventura Regional Groundwater Model was used to evaluate all FCGMA management strategies that change the water budget within the FCGMA – that is, all projects that have recharge and/or groundwater pumping components. The model is a groundwater flow model, not a chemical transport model, so water quality changes could not be directly tested. However, water quality changes could be inferred from the groundwater flows and groundwater elevations in cases such as seawater intrusion – we know how high groundwater elevations need to be at the coastline to prevent seawater from intruding into the aquifers.

The method of evaluation of management strategies was straightforward:

1) First, the forward model was used to determine conditions in the aquifer using only existing strategies and facilities (Base Case).

2) Each strategy was independently added to the Base Case and was run through the forward model (one model run for each strategy). A final model simulation combined all the strategies to determine if together they could solve the overdraft conditions. For ease of evaluation, it was assumed that the new strategy was in place at the beginning of the model period and remained in place for the entire model period.

3) Groundwater elevation results for all the time steps within the forward model were extracted for each of the wells for which there are water-level BMOs. Water levels at the BMO wells were compared between the Base Case and the individual management strategy to determine the effect of the strategy in meeting water-level BMOs.

A2.2.1 Base Case

The Base Case included strategies and facilities currently in place. Although the hydrology of the 55 years of the forward model is based on historical data, several other model inputs are different than they were during the historic period. For instance, the Freeman Diversion allows greater diversions now than were possible before it was constructed; these additional diversions are factored into the forward model. Likewise, groundwater extractions have been reduced during the past 15 years and the forward model must reflect these changes. To calculate the correct extractions for the forward model, the 55-year period was divided into dry, average, and wet years depending upon historical rainfall and stream flow for each model year. There were roughly equal numbers of dry, average, and wet years in the model. Representative data for dry, average, and wet years were used to approximate pumping during the model period; the representative pumping included only the previous 15 years since FCGMA pumping has been reduced and was adjusted to reflect the current 15% FCGMA pumping reduction. The average pumping over the 55-year period of the forward model was calculated to be equivalent to the actual average pumping of the past 15 years (adjusted for FCGMA pumping reductions).

The Base Case does not include potential future changes in pumping or recharge – it represents today's social, economic, and water use conditions, but tests the status quo over a range of hydrologic conditions. In this manner, various groundwater management strategies can be modeled and compared to the Base Case with no other changing conditions to complicate the comparison. Additional model simulations could factor in such changes as potential land use conversion (e.g., agriculture to urban), but it is appropriate to have these model simulations separate from the Base Case.

The Base Case is the starting point for each of the management strategies that were evaluated with the model. Each simulation discussed below simply adds the new management strategy to the Base Case for comparison. The only exception is the Combined Strategies simulation, where all the modeled strategies are combined in a single simulation.

Base Case Evaluation	***Upper Aquifer***	***Lower Aquifer***
BMO Avg (ft msl)	5.3	17.6
Base Case		
Avg (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%

Table 10. Results of Base Case groundwater model simulation. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.2 Sensitivity Analysis – Understatement of Reported Extractions

Concerns have been voiced that pumping reported to the FCGMA may be understated by agricultural irrigators because of either poorly-calibrated water meters or inaccuracies in using other reporting methods. To test the effect of understated pumping on modeling results, the Base Case was modified to increase agricultural pumping by 15% during all hydrologic conditions (i.e., wet, average, and dry model years). This modified simulation yielded lower groundwater levels, as would be expected (Table 11).

Pumping Sensitivity Analysis	***Upper Aquifer***	***Lower Aquifer***
Change in Avg BMO Water Levels (ft)	-7.3	-15.0
Change in % of Time Above BMO	-9%	-3%

Table 11. Change in model results for the Base Case if actual agricultural pumping was increased by 15%. The negative changes indicate that groundwater levels would be lower at BMO wells and the percentage of time that groundwater levels were above BMOs would be less.

The sensitivity analysis indicates that the Base Case modeling results may be overestimating future groundwater levels. However, if the model was recalibrated in the future to correct for any understatement of pumping, it is likely that the results would not look much different than the present Base Case. This would happen because if pumping was increased over the calibration period, then this pumping must be balanced by additional recharge that has not been accounted for. If the re-calibrated model has more recharge, then the increased pumping that would be added to the Base Case would potentially be offset by this increased recharge.

The main conclusion to be drawn from the sensitivity analysis is that the current management strategies for the basin may not be as effective as modeled, but not by any amount that would change conclusions of this Plan. More management strategies are still required, and because most of the modeling effort compares one strategy against another (a comparative rather than an absolute analysis), errors will be relatively small. However, if the meter calibration effort planned by the FCGMA proves that there is indeed understating of pumping, the model should be recalibrated to ensure that errors are marginalized.

A2.2.3 Continuation of 25% Pumping Reduction

This simulation compares attainment of BMOs between current 15% pumping reduction and full 25% pumping reduction. The 15% pumping reduction is the Base Case for the model. Thus, an additional 10% pumping reduction is applied for this comparison simulation. This reduction is applied only to M&I wells because agricultural wells have already taken actions that have reduced pumping in excess of 25% and it is unlikely that any additional steps in changing irrigation methods will be undertaken before the 2010 date for full implementation of the 25% pumping reductions. .

Pumping for each M&I well in the model is reduced by an additional 10% for the complete model period. This results in 3,800 AFY of reduced pumping across the FCGMA.

The results of this simulation are indicated in Table 12.

25% Reduction Evaluation	*Upper Aquifer*	*Lower Aquifer*
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
25% Pumping Reduction		
Avg Level (ft msl)	4.9	-37.8
Improve from Base Case (ft)	1.2	2.2
% of Time Above BMO	53%	7%

Table 12. Results of groundwater model simulation for the continuation of the 25% FCGMA pumping reduction. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.4 RiverPark Recharge Pits

Compares attainment of BMOs between current recharge operations (Base Case) and the addition of the RiverPark Recharge pits. Using UWCD's daily river routing model, available storm flow that is not already diverted by the Freeman Diversion is diverted to the RiverPark Recharge Pits for percolation and recharge. This additional recharge is generally only available during the winter and spring of wetter years when river flow exceeds UWCD's current recharge capabilities. The amount of recharge water applied in any one quarter to the model for the RiverPark pits is calculated in daily increments through the river routing model, and takes into account both water availability and recharge capacity in the pits. The extra recharge varies from an average of 400 AFY in dry years to an average of 11,500 AFY during wet years.

The results of this simulation are indicated in Table 13.

RiverPark Recharge Evaluation	*Upper Aquifer*	*Lower Aquifer*
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
RiverPark Recharge		
Avg Level (ft msl)	3.7	-40.0
Improve from Base Case (ft)	<0.1	<0.1
% of Time Above BMO	52%	6%

Table 13. Results of groundwater model simulation for the RiverPark Recharge project. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.5 GREAT Project

This simulation compares attainment of BMOs between current basin operations (Base Case) and the addition of the GREAT project. This simulation was performed in two parts to reflect the two phases of the project that were evaluated in the City of Oxnard's EIR for the project. Although the project phases are in reality scheduled sequentially, the model simulates each phase separately to determine the effectiveness of each. For model purposes, Phase I includes 5,000 AFY of reclaimed water, with one fourth of the water being injected in the Ocean view area of the south Oxnard Plain during the first quarter of each year when agricultural demand is low, and three fourths of the water delivered to agricultural irrigators within the PTP service area in-lieu of pumping their own wells. The City of Oxnard then retrieves the 5,000 AFY of injection/in-lieu recharge (as storage credits) equally from UWCD's O-H well field in the Oxnard Plain Forebay and the City's Water Yard wells located just outside the Forebay.

The Phase II model simulation includes 21,000 AFY of reclaimed water delivered in the same proportions between direct injection and in-lieu deliveries. However, the area receiving reclaimed water for irrigation is expanded to include the Pleasant Valley County Water District delivery area. In addition, the winter injection is accomplished through a series of barrier wells located along Highway 1 and Hueneme Road. The City of Oxnard then retrieves one-third of the 21,000 AFY of injection/in-lieu recharge (as storage credits) from UWCD's O-H well field in the Oxnard Plain Forebay and two-thirds from the City's own wells located just outside the Forebay.

Phase I Results: The results of this simulation are indicated in Table 1. The 8-foot improvement in Lower Aquifer groundwater levels at BMO wells is partially offset by the drop of less than one foot in Upper Aquifer BMO wells. The average drop in groundwater levels in the Oxnard Plain Forebay basin resulting from the extraction of the FCGMA credits is 2 to 3 feet.

GREAT Project Phase I Evaluation	***Upper Aquifer***	***Lower Aquifer***
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
GREAT Project Phase I		
Avg Level (ft msl)	3.4	-31.9
Improve from Base Case (ft)	-0.3	8.1
% of Time Above BMO	51%	9%

Table 1. Results of groundwater model simulation for Phase I of the GREAT project at full capacity. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

Phase II Results: The results of this simulation are indicated in Table 15. The 38-foot improvement in Lower Aquifer groundwater levels at BMO wells is partially offset by the one-foot drop in Upper Aquifer BMO wells. The average drop in groundwater levels in the Oxnard Plain Forebay basin resulting from the extraction of the FCGMA credits is 6 to 11 feet.

GREAT Project Phase II Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
GREAT Project Phase II		
Avg Level (ft msl)	2.6	-1.5
Improve from Base Case (ft)	-1.1	38.5
% of Time Above BMO	51%	36%

Table 15. Results of groundwater model simulation for Phase II of the GREAT project at full capacity. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.6 Shift Some Pumping From LAS to UAS

This simulation compares attainment of BMOs between current basin operations (Base Case) and the shifting of some pumping from the Lower Aquifer back to the Upper Aquifer in critical areas. For purposes of the model scenario, pumping is shifted only in the area of the Oxnard Plain basin where Lower Aquifer groundwater levels are well below sea level (southwest of the zone of low conductance that extends from the Camarillo Hills to Port Hueneme). Actual FCGMA policy might vary from this, but the model run demonstrates the effect of this policy change in a discrete area. In the simulation, 5,000 AFY of Lower Aquifer System pumping is moved to nearby Upper Aquifer System wells (or new UAS wells if necessary). There is no shift in pumping in areas where UAS water quality is not suitable for irrigation.

The results of this simulation are indicated in Table 16.

LAS to UAS Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
LAS to UAS Shift		
Avg Level (ft msl)	2.6	-31.8
Improve from Base Case (ft)	-1.1	8.2
% of Time Above BMO	50%	9%

Table 16. Results of groundwater model simulation for shifting 5,000 AFY of pumping from the Lower to the Upper Aquifer in the south Oxnard Plain basin. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.7 Import Additional State Water

This scenario compares attainment of BMOs between current basin operations (Base Case) and the purchase and recharge of additional State Water. For the purposes of this model simulation, an additional 10,000 AF of State Water is purchased during average and dry years, delivered to Lake Piru, and then released down the Santa Clara River as part of UWCD's normal conservation release. The portion of this water that is likely to reach the Freeman Diversion, as calculated separately using UWCD's daily river routing model, is then diverted at the Freeman Diversion and recharged in UWCD's spreading ponds in the Oxnard Plain Forebay basin.

The results of this simulation are indicated in Table 17. Average groundwater levels in the Oxnard Plain Forebay basin would be 4 to 6 ft higher than the Base Case, providing mitigation for other strategies that have a component of pumping additional groundwater from the Forebay.

Import State Water Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Import SWP		
Avg Level (ft msl)	5.5	-38.7
Improve from Base Case (ft)	1.8	1.3
% of Time Above BMO	54%	7%

Table 17. Results of groundwater model simulation of importing additional State Water. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.8 Increase Diversions from Santa Clara River

This simulation compares attainment of BMOs between current basin operations (Base Case) and increasing recharge from the Santa Clara River during periods of high storm flow. For purposes of this model simulation, it is assumed that the diversion rate and license of the Freeman Diversion is increased to 1,000 cfs from its current 375 cfs. Thus, during times of high flow, up to 1,000 cfs could be diverted. These additional diversions are recharged at UWCD's facilities according to their unused capacity, as determined by UWCD's daily river routing model. For purposes of the model scenario, it is assumed that the RiverPark recharge facility is available and that the Ferro gravel pit has been converted to use for recharge and storage.

The results of this simulation are indicated in Table 18. Average groundwater levels in the Oxnard Plain Forebay basin would be 6 ft higher than the Base Case, providing mitigation for other strategies that have a component of pumping additional groundwater from the Forebay.

Increase Diversions Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Increase Diversions		
Avg Level (ft msl)	6.4	-37.4
Improve from Base Case (ft)	2.7	2.6
% of Time Above BMO	54%	8%

Table 18. Results of groundwater model simulation for increasing diversions from the Santa Clara River. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.9 Additional In-Lieu Deliveries to South Oxnard Plain

This model scenario compares attainment of BMOs between current basin operations (Base Case) and the delivery of additional in-lieu recharge water to the south Oxnard Plain. For purposes of this model simulation, it is assumed that there are 3,000 AFY of in-lieu water available for delivery to irrigation irrigators in the area south of the end of the PTP Pipeline. This in-lieu water delivery is adjusted for changes in quarterly agricultural demand.

The results of this simulation are indicated in Table 19.

In-Lieu S Oxnard Plain Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
In-Lieu S Oxnard Plain		
Avg Level (ft msl)	4.9	-35.9
Improve from Base Case (ft)	1.2	4.1
% of Time Above BMO	53%	7%

Table 19. Results of groundwater model simulation of delivering additional in-lieu water to pumpers on the southern Oxnard Plain basin. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.10 Shift Some Pumping to Northwest Oxnard Plain

This simulation compares attainment of BMOs between current basin operations (Base Case) and shifting some pumping to the northwest Oxnard Plain from areas less easily recharged. For this model simulation, it is assumed that 2,000 AFY of M&I pumping is moved from the portion of the Oxnard Plain near the Forebay basin to the northwest Oxnard Plain. This pumping is shifted from the City of Oxnard's Water Yard and Blending Station to the area within 2 miles of the ocean along Gonzalez Rd.

The results of this simulation are indicated in Table 20.

Shift NW Oxnard Plain Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Shift NW Oxnard Plain		
Avg Level (ft msl)	3.9	-39.7
Improve from Base Case (ft)	0.2	0.3
% of Time Above BMO	51%	5%

Table 20. Results of groundwater model simulation of shifting some pumping to the northwestern portion of the Oxnard Plain basin. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.11 Injection of Treated River Water in Overdrafted Basins

This model scenario compares attainment of BMOs between current basin operations (Base Case) and the injection of treated river water into the south Oxnard Plain and Pleasant Valley areas when there are unused river diversions either during the wet portion of the year or during extended times during very wet years. The rate of injection was varied from 1,500 AFY during dry years to 5,000 AFY during wet years. For purposes of this simulation, it is assumed that the injection sites are located both within the PTP system and the Pleasant Valley CWD service area along the deepest portion of LAS pumping depression.

The results of this simulation are indicated in Table 21.

Injecting River Water Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Injecting River Water		
Avg Level (ft msl)	5.0	-32.6
Improve from Base Case (ft)	1.3	7.4
% of Time Above BMO	53%	11%

Table 21. Results of groundwater model simulation of injecting treated river water in the south Oxnard Plain and Pleasant Valley areas. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.12 Switch Location of City of Camarillo Pumping

To test the effectiveness of moving pumping from near the Camarillo airport to an area along the Arroyo Las Posas (see section 9.3 *Development of Brackish Groundwater, Pleasant Valley Basin*), the pumping from the airport well was eliminated for the model simulation. Model results indicate that the worst portion of the pumping depression would be decreased considerably in size, leaving a smaller depression in the southern Pleasant Valley basin (Figure 58).

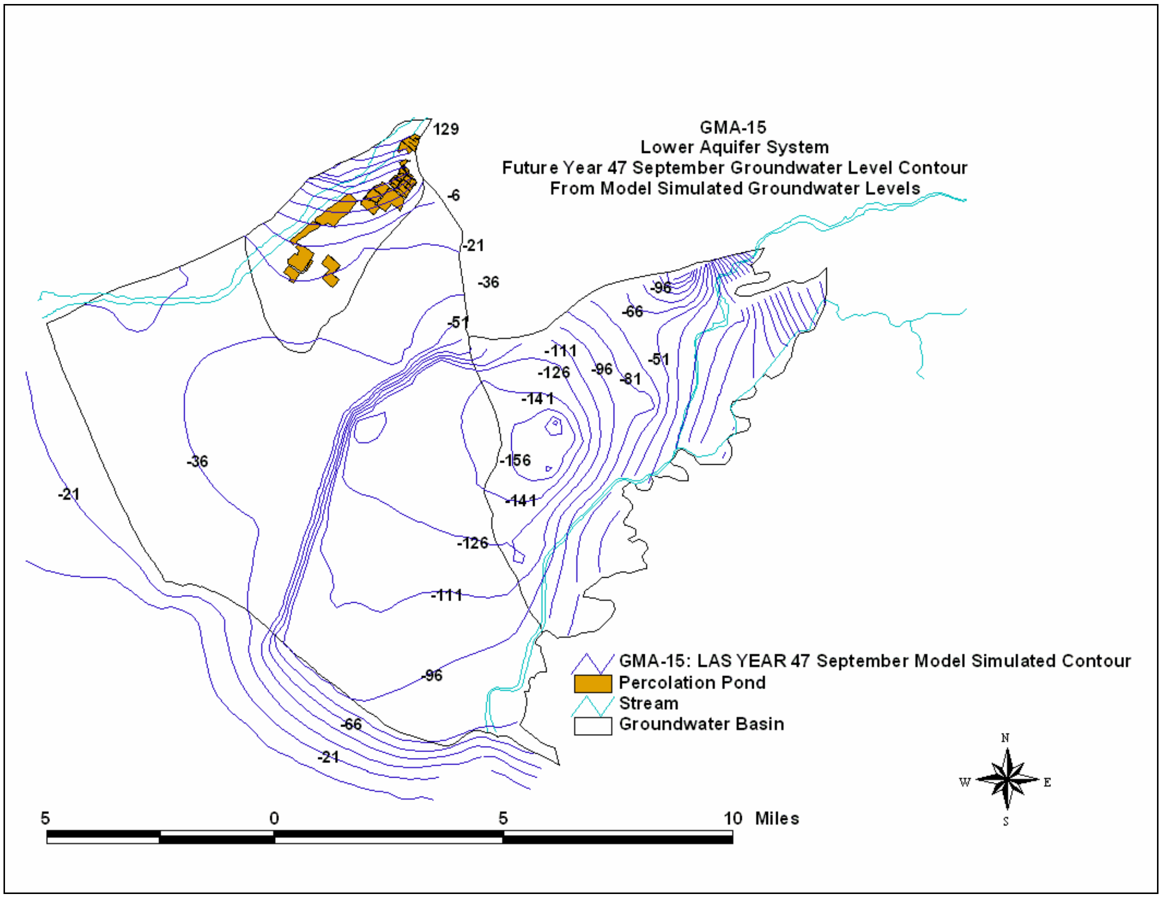


Figure 58. Simulated groundwater elevations for the LAS during the model year corresponding to the 1990 drought year, when the pumping trough beneath Pleasant Valley and the south Oxnard Plain was most pronounced. The elimination of pumping from the City's airport well decreased the size of the northern portion of the pumping depression.

A2.2.13 Full-Time Barrier Wells in South Oxnard Plain

This simulation compares attainment of BMOs between current basin operations (Base Case) and the use of barrier wells in the south Oxnard Plain to build a recharge mound that prevents coastal chloride contamination from moving further inland. The effectiveness of barrier wells was partially tested for the GREAT project. This simulation assumes that there is water available during the entire year for injection – the actual water available would likely be a combination of recycled water and other water sources. To dovetail with the GREAT simulation's winter-only injection scenario, the water available for injection in the barrier wells was modeled at 21,000 AFY, which was injected at a constant rate throughout the year. The barrier wells used in the simulation are identical to the locations of the GREAT Phase II barrier wells along Highway 1 and Hueneme Road.

The results of this simulation are indicated in Table 22.

Barrier Wells Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Barrier Wells		
Avg Level (ft msl)	15.2	6.5
Improve from Base Case (ft)	11.5	46.5
% of Time Above BMO	63%	48%

Table 22. Results of groundwater model simulation for a barrier well project in the south Oxnard Plain. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A2.2.14 Combined Management Strategies

The management strategies used in the previous simulations were combined in a single model run to determine their overall combined effect in reaching BMOs. This model simulation is an indicator of whether additional management strategies are needed beyond those in this Plan.

The results of this simulation are indicated in Table 23. The most important result is that the combined management strategies allow BMOs to be met 67% of the time in the Upper Aquifer and 76% of the time in the Lower Aquifer. This result suggests that if all the management strategies in the Plan are implemented, the basin would be relatively safe from saline intrusion (see discussion in section 7.0 *Yield of the Groundwater Basins* on level of attainment of BMOs).

Combined Strategies Evaluation	Upper Aquifer	Lower Aquifer
BMO Avg Level (ft msl)	5.3	17.6
Base Case		
Avg Level (ft msl)	3.7	-40.0
% of Time Above BMO	51%	5%
Combined Strategies		
Avg Level (ft msl)	18.4	59.8
Improve from Base Case (ft)	14.7	99.8
% of Time Above BMO	67%	76%

Table 23. Results of groundwater model simulation of implementing the combination of all the management strategies evaluated using the groundwater model. Groundwater elevations are averages for Upper and Lower Aquifer wells for which there is a groundwater elevation BMO. Also indicated is the percentage of time (weekly time steps) that groundwater elevations were above the BMO elevation for each BMO well.

A3.0 APPENDIX C. EAST LAS POSAS BASIN MANAGEMENT PLAN

During the February 23, 1994 meeting, the Board of Directors of the FCGMA conditionally approved CMWD's Application for the Injection/Storage Facilities in the North Los Posas Basin. (**Note:** The reference to the North Las Posas Basin stems from the FCGMA original Groundwater Management Plan adopted in 1985. The current correct reference is the East Las Posas Basin).

This approval was conditioned upon several factors including but not limited to: (1) a maximum of 20 injection/storage wells registered with the FCGMA; (2) well injection/extraction schedule determined by availability of water and needs of CMWD's customers; (3) continuous injection period well testing and monthly reporting of acre-feet injected/extracted from wells along with water quality analysis for selected constituents to the FCGMA by CMWD; (4) maximum storage limit of 300,000 acre-feet without further approval of the FCGMA; (5) extraction/injection points shall be coterminous, or in proximate vicinity and coordinated with the FCGMA; (6) water stored in such facilities shall be used in Ventura County; (7) CMWD periodic review of the effects of the injection on surrounding basins to ensure no detrimental effect; (8) CMWD shall have an affirmative obligation to mitigate any detrimental effects found; and (9) FCGMA approval standards for the injection/storage wells shall be mandatory. These conditions were memorialized in a July 12, 1994 letter from Lowell Preston, Ph.D., Agency Coordinator, to Eric Berg, Administrator, CMWD (See Appendix C - Exhibit A).

Subsequently to FCGMA's above mentioned approval, CMWD engaged in several years of discussions about groundwater issues in the Las Posas basin with members of the East Las Posas Basin Users Group (the Group) and individual pumpers. This informal Group, which meets every second month, discusses both basin-wide groundwater issues and potential issues related to Calleguas' Las Posas Basin ASR project.

As a result of those discussions, CMWD and the Group developed the East Los Posas Basin Management Plan (ELPBMP). The ELPBMP, which outlines a monitoring program for the injection/storage wells, establishes action levels, sets stakeholder responsibilities for operation of the ASR project by CMWD, and provides for a dispute resolution mechanism between the parties, attempts to manage the ASR project in such a way as to minimize problems and maximize the beneficial use of groundwater within the East Las Posas Basin..

The ELPBMP is attached to the FCGMA Management Plan as Appendix C. It is understood by the parties that the East Las Posas Basin Management Plan will be reviewed and updated regularly as conditions warrant it.

The Plan begins on the following page.

EAST LAS POSAS BASIN
MANAGEMENT PLAN

THIS MANAGEMENT PLAN FOR THE EAST LAS POSAS BASIN (the "Plan"**)** is effective as of ______________, 2006, and is created with reference to the following recitals of fact, understandings and intentions:

RECITALS

A. Calleguas Municipal Water District ("Calleguas") operates an Aquifer Storage and Recovery Project ("ASR") for the benefit of its urban, industrial and agricultural water delivery customers in the Las Posas Basin ("Basin") in Ventura County, California.

B. The Basin is identified as a groundwater subsystem within the boundaries of the Fox Canyon Groundwater Management Agency ("GMA").

C. The ASR project stores potable water in the aquifers of the Basin for use during emergencies and drought periods.

D. The Las Posas Basin Pumpers extract groundwater from the Basin for beneficial uses that include agricultural, domestic, urban and industrial uses. The "Las Posas Basin Pumpers" includes members of the Las Posas Basin Users Group and all other persons or entities extracting groundwater from the East Las Posas Basin (within the boundaries of the GMA).

E. Calleguas and the Las Posas Basin Pumpers desire to manage the groundwater basin such that the ASR project and the Las Posas Basin Pumpers' beneficial uses co-exist to the benefit of all.

F. Calleguas has previously entered into an agreement with the GMA for operation of the ASR project ("Calleguas-GMA Agreement"). A copy of the Calleguas-GMA Agreement is attached hereto as Exhibit "A" and incorporated herein by reference. The Calleguas-GMA Agreement describes the general principles within which the ASR project will operate.

G. Pursuant to the Calleguas-GMA Agreement, stored water is credited to the ASR project when Calleguas either injects potable water into the aquifer through wells or when water is delivered by or through Calleguas to the Las Posas Basin Pumpers in lieu of pumping groundwater. The storage credit pursuant to the Calleguas-GMA Agreement remains in the Basin until the stored water is extracted.

H. Calleguas and the Las Posas Basin Pumpers desire to have the GMA incorporate the terms of this Plan into the updated GMA plan.

NOW, THEREFORE, in consideration of the mutual benefits, covenants and promises set forth herein, the Management Plan for the East Las Posas Basin is as follows:

1. **<u>Monitoring Program</u>**. Calleguas will maintain a monitoring program to track changes in groundwater levels and groundwater quality in the Basin. This monitoring program will consist of two parts: (1) a set of four representative key wells spaced throughout the Basin ("baseline key wells") will monitor the overall health of the Basin (Exhibit "B" and identified by State Well number); and (2) a set of monitoring and producing wells on parcels within or adjacent to the ASR project ("local vicinity wells") will monitor the effects of the ASR injection and pumping on the Basin (Exhibit "C").

2. **Report of Results of Monitoring Program**. Calleguas will report results of the monitoring program described in paragraph 1 above in writing to the Las Posas Basin Pumpers at least every six (6) months during noticed meetings of the Las Posas Basin Users Group. In addition, Calleguas will prepare a written report on ASR activities, monitoring results and the state of the Basin annually, and that report will also be made available to the Las Posas Basin Users Group.

3. **Extractions and Storage Credits**. Calleguas covenants and promises that it will only extract water consistent with the Calleguas-GMA Agreement and in an amount which does not exceed Calleguas' storage credits in the Basin, as they may exist at any time. Calleguas will apply for storage credits from the GMA annually based on the amount of water injected and in lieu water delivered that year; the GMA will maintain the storage credit balance for the ASR project and will give written notice to the Las Posas Basin Users Group of the amount of those credits annually and provide a report directly to the Las Posas Basin Users Group every six months as to the amount of storage and extractions which have occurred.

4. **Operation of ASR Project**. Calleguas will operate the ASR project in a manner that does not adversely affect the Basin by creating, by way of example only, chronic declining water levels, increased levels of TDS or chlorides, significant increased pumping lifts, or saline intrusion. It is acknowledged that all currently available information indicates that the Basin may be in overdraft. Although it is not projected that the ASR project will alleviate the overdraft, Calleguas will make a good faith effort to assist the Las Posas Basin Pumpers in reducing the overdraft. Additionally, it is recognized that there is a mound of high-chloride, high-TDS water migrating into the Basin from beneath the Arroyo Las Posas. Calleguas will assist in mitigating this water quality problem by facilitating projects that will pump this poor-quality water, treat it for agricultural and drinking water use and discharge the resulting brine into a regional brine line. To keep Las Posas Basin Pumpers informed of ASR operations, Calleguas will provide a summary sheet of injections and extractions relating to ASR operations at every Las Posas Basin Users Group meeting (held approximately every two months, but no less than 4 times a year). This summary will discuss, among other things, all injection, extraction and in-lieu activities for the two months prior to the meeting. This summary will also be provided to the GMA.

5. **Groundwater Levels**. Calleguas will operate the ASR project in a manner which will not significantly impact Las Posas Basin Pumpers' ability to use groundwater from the Basin. Impacts will be measured on two levels – basin-wide and local. Basin-wide impacts will be measured using the four baseline key wells. Local impacts will be measured using the local vicinity wells.

Basin-Wide Effects: In order to establish groundwater levels that would exist without the ASR project ("baseline"), the USGS Santa Clara-Calleguas MODFLOW groundwater flow model, as updated by United Water Conservation District and Calleguas, will be used in conjunction with the four baseline key wells. The baseline will be established by running the groundwater model every two years using all available actual pumping and hydrologic data for the period, but excluding any ASR injection/extraction operations or water deliveries in-lieu of injection. The first run of the model for purposes of this Plan will be as follows: The modeled "no ASR project" groundwater levels determined as of September 1, 2006, at the four baseline key wells would establish the baseline for the two-year period. If actual measured water levels fall below the baseline in any of the baseline key wells during the applicable two-year period, then the cause of the groundwater level decline below the baseline will be investigated by Calleguas within 45 days of Calleguas learning of the measured water level falling below the baseline. If the water level drop below baseline is determined to be caused by ASR operations, then Calleguas will present a written plan to the Las Posas Basin Pumpers to mitigate the excess drawdown. That written plan will be presented by Calleguas to the Las Posas Basin Users Group no later than 120 days after Calleguas learns that measured water levels are below baseline.

Local Effects: In the vicinity of the ASR injection/extraction wells, it is recognized that groundwater levels will fluctuate depending upon rates of injection/extraction and proximity to the wells. Nearby wells will see groundwater levels rise and pumping lifts decrease during and following injections of stored water. During extractions of stored water, groundwater levels in the vicinity of the extraction may decrease below levels normally seen in nearby wells, with this pumping effect dissipating when extraction is terminated. Calleguas will use all reasonable efforts to insure that nearby wells can continue to be pumped during this extraction period; if lowered water levels create operational problems such as the inability to pump groundwater because groundwater levels are below pump bowls or the pump breaks suction in any nearby well, Calleguas will attempt to assist well owners in mitigating the problem. Such mitigation measures may include, among other things, providing in-lieu water to well owners at prevailing rates.

6. Disputes. If any dispute arises over the effects of the ASR program and this Plan, the specifics of the dispute will first be presented within 45 days of the dispute arising to an advisory group of members of the Las Posas Basin Users Group numbering not less than 5. If the dispute is not resolved within 45 days after submittal to the advisory group, the dispute shall be presented to Calleguas in writing. Calleguas will then, within 45 days of receiving written notice of the dispute, investigate the issues in the dispute, including performing any hydrogeologic investigation where appropriate. The disputing party will not unreasonably withhold access to historic groundwater data known to the party or access to wells for monitoring. Calleguas will, within 120 days, give a written reply to the disputing party which will include results of any hydrogeologic investigation. In the event that the party is not satisfied by this procedure, the disputing party can deliver a copy of the written dispute to the GMA. If the GMA does not resolve the problem to the satisfaction of the disputing party within 120 days of the delivery of a copy of the written dispute to the GMA, then the disputing party can take whatever legal action it deems appropriate.

7. Term. This Plan shall remain in effect so long as the Calleguas-GMA Agreement remains in effect.

8. Existing Water Rights Unaffected. This Plan and the ASR project shall in no way affect or alter existing water rights in the Basin or grant new or additional water rights to Calleguas or the Las Posas Basin Pumpers (other than the specific rights of injection and extraction granted herein). All injections or extractions are done with the knowledge and consent of the Las Posas Basin Pumpers and under no circumstances will any injections or extractions or pumping under this Plan ripen into a claim for prescriptive or superior rights.

9. Condition of Basin. This Plan is made with the express understanding and assumption that the Basin is of such condition that any water injected by Calleguas into the Basin will remain in the Basin until extracted by Calleguas (or by other pumpers). If this understanding/assumption is determined to be incorrect or determined to be substantially called into question, then **either** Calleguas or the Las Posas Basin Pumpers may immediately proceed to dispute resolution as set forth in Section 6 above.

END OF PLAN

A3.1 **EXHIBIT "A"**

FOX CANYON GROUNDWATER MANAGEMENT AGENCY

BOARD OF DIRECTORS
Lynn E. Maulhardt, Chair
John K. Flynn
Sam McIntyre
James Daniels
Michael Conroy

AGENCY COORDINATOR
Lowell Preston, Ph.D.

July 12, 1994

Eric Berg, Projects Administrator
Calleguas Municipal Water District
2100 Olsen Road
Thousand Oaks, CA 91360-6800

SUBJECT: BOARD APPROVAL OF CMWD APPLICATION FOR INJECTION/STORAGE FACILITIES IN NORTH LAS POSAS GROUNDWATER BASIN

Dear Mr. Berg:

At the Board of Directors meeting on February 23, 1994, the Board approved the CMWD application for injection/storage facilities in the North Las Posas Basin. The approval of this application, as provided for under Ordinance 5.3, was subject to the conditions that follow. These conditions include several changes and additions requested by the Board of Directors.

NORTH LAS POSAS BASIN
INJECTION/STORAGE FACILITIES CONDITIONS

1. *The identification, size, depth, well logs and location of wells used for injection/extraction will be registered with the GMA. A maximum of twenty (20) wells all to be permitted by the County of Ventura, Public Works Agency, and registered with the GMA.*

2. *Calleguas will inject/extract on a schedule determined by availability of water to inject and the needs of their customers. The number of acre-feet injected/extracted from each well shall be reported to the GMA monthly. The monthly report shall also include a water quality analysis for the injected water that covers and conforms to the limits listed for the following items:*

a.	*Sodium Adsorption Ratio (SAR) calculated in meq/l as $SAR=NA/((CA + Mg)/2)^{.5}$*	*$\geq 1 \leq 4$*	
b.	*Total Dissolved Solids (TDS)* *Electrical conductivity (EC)*	*$\geq 100 \leq 800$* *≤ 1100*	*mg/l* *uMHO*
c.	*Chloride (Cl)*	*≤ 120*	*mg/l*
d.	*Boron (H_3Bo_3)*	*≤ 1*	*mg/l*
e.	*Nitrates*	*<45*	*mg/l*

(NOTE: These limits are based on University of California research. Should the University reverse these limits, the recommended changes will be incorporated into these conditions.)

800 South Victoria Avenue, Ventura, CA 93009
(805) 654-2088 FAX:(805) 654-3952

Eric Berg
Page Two
July 12, 1994

Testing shall be conducted monthly during periods of continuous injection, prior to beginning an injection of more than one hundred (100) acre-feet (but no more frequently than monthly), and as frequently as necessary when a change in water quality is suspected or known to exist.

3. *The total water in storage at any one time shall not exceed three hundred thousand (300,000) acre-feet (AF) unless approved by the GMA Board of Directors.*

4. *The point of extraction shall be the same as the point of injection or in the near vicinity. Extraction from points other than that of injection may be desirable and shall be coordinated with, and approved by the GMA.*

5. *Water stored by the facility shall be used in Ventura County.*

6. *Calleguas shall periodically review the effects of the injection on surrounding basins to ensure no detrimental effects result from the injection alone or in combination with natural recharge. Should negative effects exist, Calleguas shall take action to mitigate those effects caused by the injection program.*

7. *Should the injected water or conditions deviate from these standards, injection will stop, or not be started until the condition has been corrected.*

If you have any questions regarding this Agency's approval of your project facilities, please call Rick Farnsworth at 654-2327 or myself at 648-9204.

Very truly yours,

Lowell Preston

Lowell Preston, Ph.D.
Agency Coordinator

RF:vg

3GG/berg

A3.2 EXHIBIT “B”

Key wells will be used to monitor the overall health of the basin (Figure B-1). These wells, which have a long historic monitoring record of groundwater levels, include State Well Numbers 2N/20W-8F1, 2N/20W-9F1, 3N/20W-34G1, and 3N/19W-29K4.

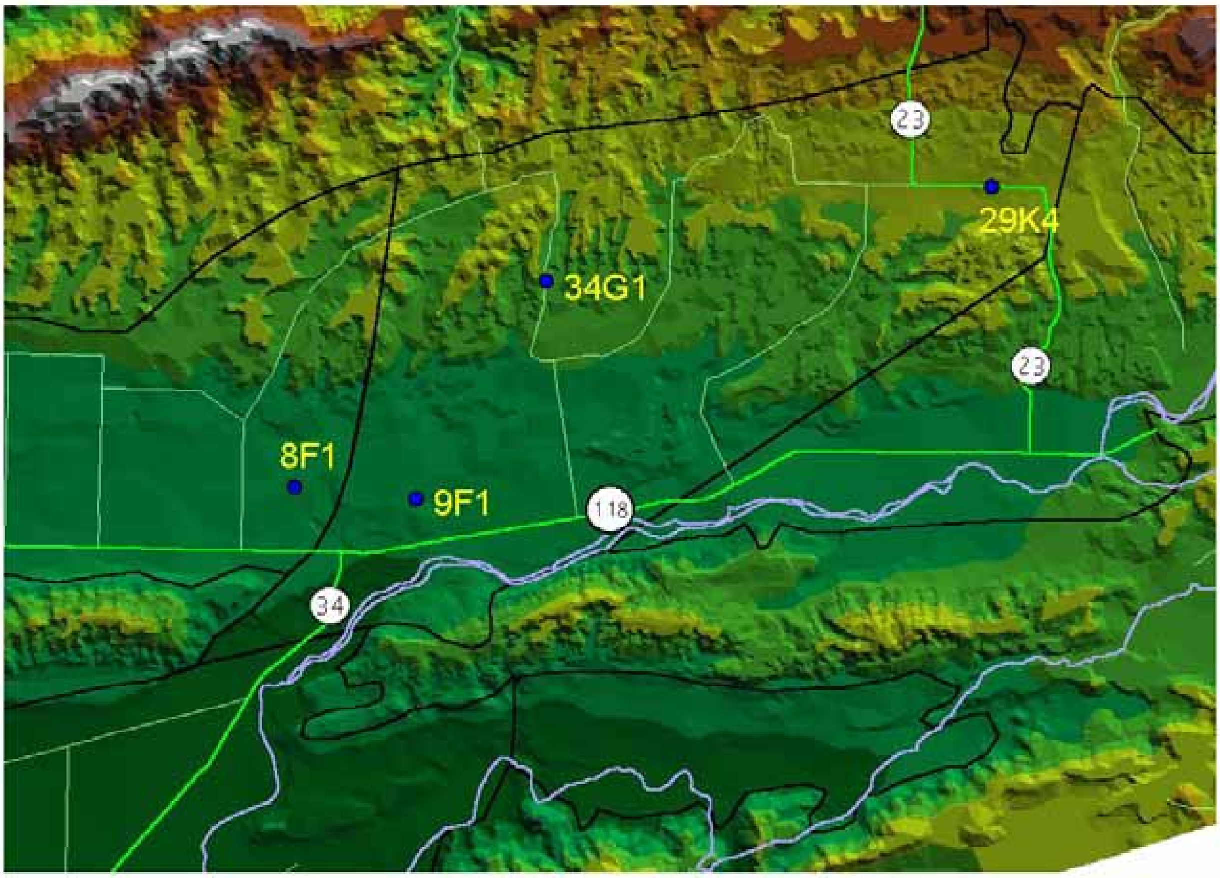


Figure B-1. Key wells in the Las Posas basin.

A3.3 EXHIBIT "C"

Calleguas Municipal Water District will monitor the effects of its Las Posas Basin ASR project using both its ASR wells and additional monitoring points surrounding the ASR project (Figure C-1). These additional monitoring points will consist of existing production wells or, where necessary to complete the area 1 coverage, new monitoring well(s) installed by Calleguas MWD.

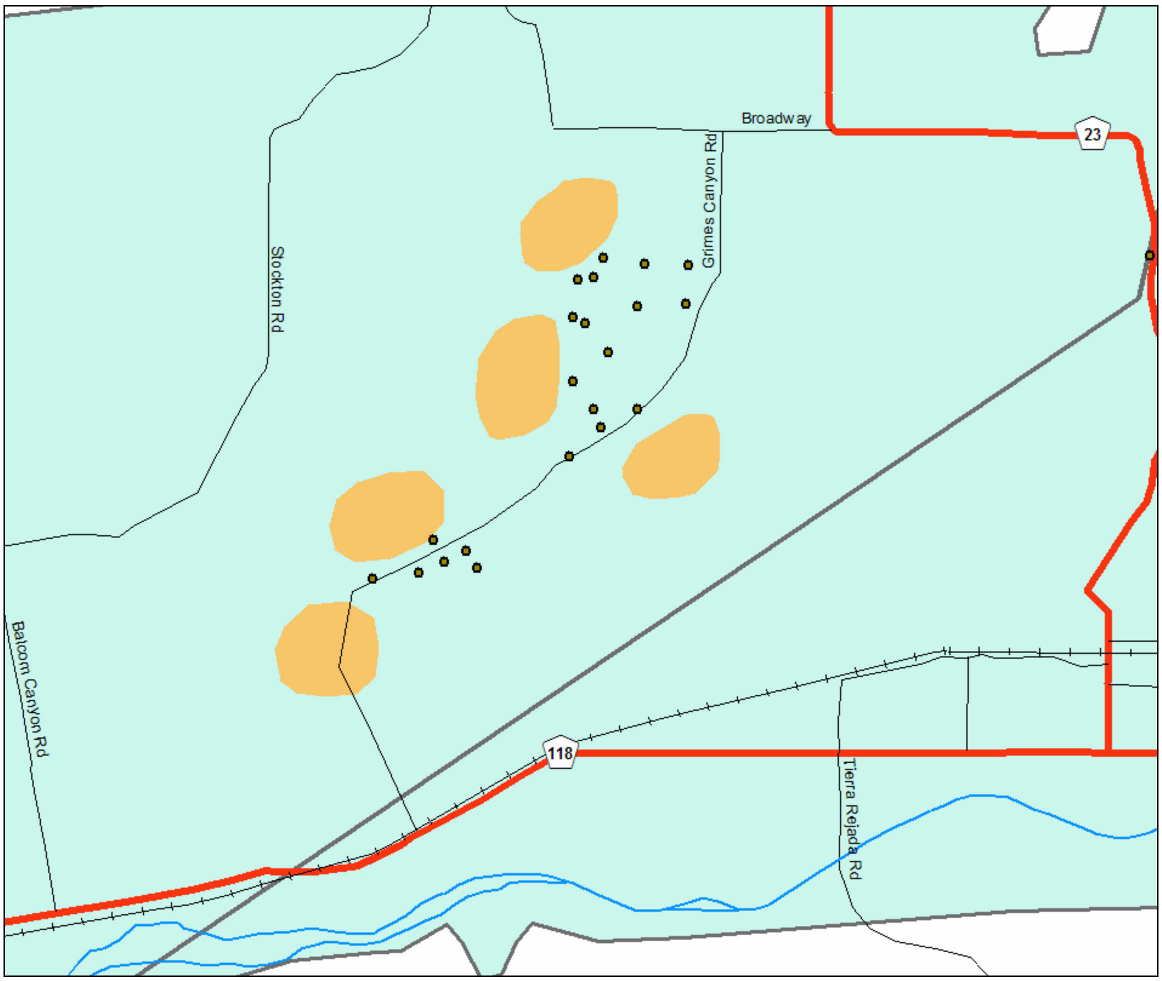


Figure C-1. Locations (indicated by orange circular areas) of monitoring to track the effects of ASR injection and pumping. Dots represent Calleguas MWD ASR wells.

A4.0 APPENDIX D. RESPONSE TO PUBLIC COMMENTS ON THE FCGMA GROUNDWATER MANAGEMENT PLAN

The development of the final FCGMA Groundwater Management Plan involved the release of three separate written drafts between June 2006 and February 2007, presenting the Plan at three public workshops over the same time period, and presenting the Final Plan at a special meeting for the Agency's Board of Directors in March 2007. The Agency accepted public comments throughout the Plan development process.

This section is a compilation of the written public comments to the Plan submitted to the Agency between June 2006 and April 2007. The first part contains a verbatim transcription of each comment and a specific Agency response to each comment. The second part contains a reproduction of the original public comment document.

FCGMA responses to written comments submitted on behalf of the City of Oxnard, City of Camarillo, and Crestview Mutual Water Company (Crestview) by:

Robert J. Saperstein
HATCH & PARENT
A Law Corporation
Santa Barbara, CA

1. ***Oxnard, Camarillo, and Crestview's Comment:*** *GMA Board attendance at the workshops. While we understand the time commitment is extensive, this update to the Management Plan is very important. It will guide GMA policy and decision-making for years to come. We are not sure how the GMA Board can obtain adequate familiarity with all the issues and the constituents' concerns without some attendance at the workshops. No board members attended the first workshop.*

Response to Oxnard, Camarillo, and Crestview's Comment #1: This issue was subsequently resolved by the Board member attendance at subsequent workshops and the Special Groundwater Management Plan Workshop held on March 9, 2007. Four Directors and two Alternate Directors were in attendance at this Workshop. Minutes for this meeting have been included in this Appendix (D) to the Groundwater Management Plan.

2. ***Oxnard, Camarillo, and Crestview's Comment: Executive Summary***. *This Section is written as part introduction and part summary. An Executive Summary is normally drafted when the remainder of the document is complete. Given the length and technical nature of the material, the Executive Summary will be the most important Section of the Plan. It may be the only portion of the document many individuals read. It should summarize the purpose, issues and recommendations, once all of the technical work is complete.*

Response to Oxnard, Camarillo, and Crestview's Comment #2: Taking this suggestion, the Executive Summary was put on hold until the final draft. The final version now includes an Executive Summary

3. ***Oxnard, Camarillo, and Crestview's Comment: Acknowledgements*****.** *Throughout the document, there is repetitive recognition of United and Calleguas as the two entities who contribute to the GMA. This recognition is limited almost exclusively to these two entities. Either this self-congratulatory language should be eliminated, or there should be proper acknowledgement of the work of all the individuals and agencies who have and continue to contribute to the GMA's success.*

Response to Oxnard, Camarillo, and Crestview's Comment #3: The final Fox Canyon Groundwater Management Plan (Plan) acknowledges the contributions many contributors including members of the three sponsoring agencies (Fox Canyon Groundwater Management Agency, United Water Conservation District, Calleguas Municipal Water District) as well as six other stakeholders who provided written comments, reviews, or provided other material input to the completion of the plan. Any other omission of other individual who provided contributions to the completion of the FCGMP is the result of simple oversight.

4. ***Oxnard, Camarillo, and Crestview's Comment:*** *Modeling. There needs to be a distinct Section that better describes the model details used for the technical analysis. This Section need not be long, but it should include mention of the software, construction, assumptions and details of the model construct. It ought to give enough information for the technically capable reader to understand its basics.*

Response to Oxnard, Camarillo, and Crestview's Comment #4: There is now a considerable discussion of the modeling approach, assumptions, limitations, and modeling results included as Appendix B of the final FCGMP. While not an exhaustive technical discussion of model development and results, it provides a thorough and meaningful summary of the model approach and its use in the development and analysis of various policies developed in the Plan.

5. ***Oxnard, Camarillo, and Crestview's Comment: Organization and Redundancy.*** *There is tremendous redundancy in the report. Perhaps with different organization, it could be slimmed down significantly. You might describe the water quality and quantity issues generally applicable to all areas, along with the general concept of basin management objectives. Then discuss all the issues comprehensively, separated for each basin or in some cases regions with multiple basins. As an alternative, some of the nonessential background and detailed technical information might be moved to appendices.*

Response to Oxnard, Camarillo, and Crestview's Comment #5: The final Plan has been reorganized and indexed to limit redundancies and improve the organizational structure. Due to the interrelated nature and technical complexity of many of the water quality, water quantity, and public policy issues, some redundancy is necessary to provide the appropriate context for specific topics.

6. ***Oxnard, Camarillo, and Crestview's Comment: Management Strategies: Organization.*** *In a fashion, the Management Plan is really several separate management plans. Perhaps it should be organized by basin for the three content subjects: strategies under development, future strategies and actions to attain BMO's. There may need to be one more general Section that addresses those strategies that cross basin boundaries. You may be able to combine all the basin specific discussions in one Section for each basin. A couple different organizational approaches might be tested, with the goal of, reducing redundancy and volume of text.*

Response to Oxnard, Camarillo, and Crestview's Comment #6: See the response to Oxnard, Camarillo, and Crestview's Comment #5.

7. ***Oxnard, Camarillo, and Crestview's Comment: Specific strategy: Forebay priorities****. The potential over-reliance on the Forebay under certain conditions is acknowledged in the document. However, there is no mention of the importance, from a policy perspective, to establish some hierarchy for use of the Forebay. There will be increasing reliance on the Forebay. To the extent access to the Forebay may be limited under certain conditions; the GMA board must consider limiting certain uses before others.*

Response to Oxnard, Camarillo, and Crestview's Comment #7: As implied by Oxnard, Camarillo, and Crestview's Comment #7, the Plan acknowledges that the Oxnard Plain Forebay Basin represents one of the most significant sources of subsurface storage and recharge within the FCGMA. Specific groundwater management strategies directly involving the use of the Oxnard Plain Forebay Basin have been addressed in Sections 10.1.4, 10.1.5, 10.1.7. Other policy recommendations are addressed in Sections 11.2.2, 11.3.6, and 11.3.7. Through its discussion in these Sections as well as its implicit inclusion other strategies, the Plan acknowledges the significance and challenge of prioritizing use of the Oxnard Plain Forebay Basin. The Oxnard Plain Forebay Basin will remain a source of significant consideration and focus in the development of effective future strategies.

8. ***Oxnard, Camarillo, and Crestview's Comment: Specific strategy: Transfers across basins.*** *There is no direct mention that transfers (of allocation or credits) from challenged areas to areas of abundance may be the simplest method of mitigating problems. This has been a policy not favored in the past. However, this is an appropriate time to reconsider this*

question, particularly if the technical analysis suggests that a surgical approach is required to solve certain problem areas.

Response to Oxnard, Camarillo, and Crestview's Comment #8: Allocation or Credit transfers are now discussed in relation to several strategies that would physically move water from one basin to another, particularly moving credits to the Forebay Groundwater Basin. In addition, many of the listed potential water management strategies move river water or reclaimed water across basins to be used for either in-lieu deliveries that replace groundwater pumping, or for direct groundwater recharge. The fundamental concept of localized management strategies is also discussed in Section 10.1.7.

9. Oxnard, Camarillo, and Crestview's Comment: Specific strategy: Ag recycled water use*. The draft Plan acknowledges (assumes) that larger volumes of recycled water will be available for Ag use in the future. The assumption is correct that highly purified recycled water will be available and recycled water use could be a very efficient method of solving several regional problems. However, there is some resistance in the Ag community to take direct use of recycled water. The resistance is not over the quality of the recycled water, but over the required reporting to distributors and product buyers that the crop was grown with recycled water. As long as there is the Ag industry perception that recycled water use may harm the user's competitiveness, recycled water will not be widely accepted. The Board may be able to help influence certain industry groups to alter the current reporting requirements that create these problems for individual users.*

Response to Oxnard, Camarillo, and Crestview's Comment #9: The comment is noted.

10. Oxnard, Camarillo, and Crestview's Comment: Analytic Methodology. *There appears to be no intent to model the expected (inevitable) conversion of Ag use to M&I use over the period of the modeling run. Without this detail, the modeling exercise may provide very misleading results. For example, there are several significant Ag to M&I projects that are in the planning stages located in the south Oxnard Plain area, nearby the City's wastewater treatment plant and the military bases. The result of these conversions will be a shift in groundwater use from wells in a highly sensitive area, to City and United wells located far from the coast (and imported water). If the model does not take into account these expected transitions, it will predict a materially different future than that which will occur. In this fashion, the modeling results may be very misleading.*

Response to Oxnard, Camarillo, and Crestview's Comment #10: The groundwater modeling purposely kept land use constant through the forward model period to analyze the quantitative effect of different groundwater management strategies (such as 5% reduction of historical allocation or implementation of an injection barrier). A typical model-based quantitative analysis, including the Ventura Regional Groundwater Model (VRGM), alters only one variable at a time to determine its effect on the entire system. Often, if more than one variable is changed, (e.g., adding a management strategy plus changing land use), the quantitative effect of either variables is obscured. The effect of changing land-use was not one of the variables examined in this analysis; however, adding such a scenario would be instructive. As part of the Plan implementation process, this may be one of the recommendations to the Technical Analysis Group (TAG).

11. Oxnard, Camarillo, and Crestview's Comment: Water Quality. *It is somewhat troubling that the cornerstone of the Plan is the setting of Basin Management Objectives, some of which are water quality objectives. However, the model has no capability to predict water quality changes. Thus, we need to be very careful in how we set and monitor compliance with the Basin Management Objectives.*

Response to Oxnard, Camarillo, and Crestview's Comment #11: It is true that the groundwater model cannot directly predict water quality changes, although there is some capacity to determine the effects of seawater intrusion in coastal areas. In these areas, controlling seawater through management of groundwater elevations is a priority goal and key component of the management plan, and is addressed in Sections 9.1, 10.2.1, and 10.3.1. In other areas, the BMOs are the Regional Board's Basin Plan Groundwater Objectives Other water quality objectives and are discussed in Section 6.1, 9.2, 9.3, 10.1.3, and 10.1.4. In the Forebay basin, nitrate BMO's are set at the Department of Health Services notification level for drinking water. As part of the Plan implementation process, this may be one of the recommendations to the Technical Analysis Group (TAG).

12. Oxnard, Camarillo, and Crestview's Comment: Periodic update. *Either as a component of the Plan, or as a Board measure in adopting the Plan, there should be a built in requirement to update the Plan no less than every 5 years. This should not be so difficult if the model proves to be as useful a tool as is expected.*

Response to Oxnard, Camarillo, and Crestview's Comment #12: This recommendation for periodic reviews and updates are now a strategy and action item in the Plan and is discussed in Section 11.1.3.

13a. Oxnard, Camarillo, and Crestview's Comment: Pg. 12. There is no such thing as "in-lieu'" credits. Ordinance 8 only defines storage and conservation credits. There are special credit transfer agreements/programs the GMA has approved that amount to "in-lieu" transfer of credits, but the term has no meaning in Ordinance 8.

Response to Oxnard, Camarillo, and Crestview's Comment #13a: The reference to "In-Lieu" credits have been eliminated or corrected and the term in-lieu is only used to refer to imported, surface, or reclaimed water that could be used instead of extracted groundwater.

13b. Oxnard, Camarillo, and Crestview's Comment: *Ordinance 8 requires Ag to demonstrate 80% efficiency, based on the individual crops grown. The Plan does not propose tightening the efficiency percentage as a potential method of reducing water use. Also, the current reporting requirements are not clear in requiring that the efficiency calculation is to be based on irrigated acreage, not total owned property. In some cases, the irrigated acreage may be materially smaller than the property footprint. In that circumstance, the user gets a substantial benefit in reporting efficiency based on the property footprint instead of the irrigated acreage.*

Response to Oxnard, Camarillo, and Crestview's Comment #13b: As indicated in Section 11.2.4, an examination of the irrigation efficiency allocation will be undertaken as part of the implementation of the Plan.

13c. Oxnard, Camarillo, and Crestview's Comment: Pgs. 13, 16. *There is no mention of M&I return flows as a source of recharge.*

Response to Oxnard, Camarillo, and Crestview's Comment #13c: Return flows have been added as a nominal potential recharge source, with the caveat this only occurs in some areas. In fact, return flows can only reach the main FCGMA aquifers in a few areas where there is hydrologic continuity between surface uses and these aquifers – elsewhere, it is intercepted by impermeable layers and/or perched aquifers.

13d. Oxnard, Camarillo, and Crestview's Comment: *Two different definitions of basin yield are used and overdraft is not defined.*

Response to Oxnard, Camarillo, and Crestview's Comment #13d: Section 7.0 of the final Plan addresses the concept of Yield of Groundwater Basins, its calculation, and the associated assumptions.

13e. Oxnard, Camarillo, and Crestview's Comment*: The discussion of the decreasing trend of extractions is incomplete and therefore misleading. As to the Ag side: (1) there is no quantification of the reduction of Ag pumping resulting from reduced acreage in production over the past two decades, and (2) there is no recognition that the initial period against which we are measuring reduced usage was a very dry period. During dry periods, Ag groundwater use tends to be greatest. Since those early years, we have been in a generally wet period. Thus, we would expect a natural reduction in Ag groundwater use simply based on the historical hydrology*.

As to the M&I side, there is no quantification of the increase in municipal demand as a result of conversion of Ag use to M&I use. There is no discussion of the relative efficiencies of use of water prior to the imposition of the cutback goals. The implication of the current discussion in the Plan is that Ag has done more than its share and M&I has not. There is insufficient information or analysis for this conclusion or implication. This discussion should either be made complete and correct, or eliminated, especially if policy decisions might be influenced by it.

Response to Oxnard, Camarillo, and Crestview's Comment #13e: The language has been changed to eliminate any implication that M&I has not done its share of water conservation or planned reductions in overall groundwater extractions. An example of ag to urban conversion was also added. The discussion of reduction in pumping does not simply compare the dry years of the base period to the wet years following that period to document reductions in pumping. Instead, extraction in like years were compared (dry to dry, wet to wet), with the comparison included in the discussion of overall FCGMA annual extractions and any changes over time. Therefore, the language on FCGMA pumping reductions remains in the Plan.

13f. Oxnard, Camarillo, and Crestview's Comment: Pg.29. *The discussion of increasing salt concentrations in the Las Posas basins is somewhat conclusory and incomplete. It might help to actually provide the POTW discharge water quality for TDS and chlorides, so that it would be more clear to the reader that the problem is, in fact, generating from aquifer conditions, not discharge water quality.*

Response to Oxnard, Camarillo, and Crestview's Comment #13f: Language was added to point out that chloride concentrations of surface waters (including POTW discharges) were considerably lower than those of the affected aquifer. While it is true that the problem was not generated by the quality of the discharge water, the problem appears to have been created by the increased quantity of discharge water (POTW's plus Simi Valley Groundwater Basin dewatering and increased urban runoff throughout the watershed). The higher stream flows created by these discharges have apparently filled the shallow aquifer above historic levels, which may be dissolving salts in the previously unsaturated portion of the shallow aquifer. The Plan references a report done for Calleguas MWD for a more-detailed discussion of this water quality problem.

F**CGMA responses to written comments submitted on behalf of the City of Oxnard by:**
Anthony Emmert
Water Resources Manager
City of Oxnard, California

1. Oxnard's Comment: *At the last workshop on the draft Plan, the group discussed the potential that incorrect assumptions about the quantity of groundwater production could result in erroneous outcomes from the model. Indeed, there is substantial anecdotal evidence that groundwater production reporting may be materially incorrect because of inaccurate meters or other faulty reporting mechanisms. For this reason, we recommend that the model be run to assume a band of uncertainty relating to the quantity of groundwater production within FCGMA. Such sensitivity analysis will help verify the integrity of the model results.*

Response to Oxnard's Comment #1: A sensitivity analysis was added to the discussion of model results in Appendix B of the final Plan. Following implementation of the meter calibration program scheduled to begin in mid-2007, it would be prudent to revisit this issue to ensure the model is calibrated with the most accurate extraction data.

2. Oxnard's Comment*: As a related matter, the FCGMA will pursue an aggressive review of meter calibrations over the next several years. However, this process is not scheduled to start until 2007 and it will take three years to complete the first cycle. We recommend that the model be periodically rerun and updated with this new, more accurate production data when it becomes available. In the interim, we recommend that FCGMA staff review suspect accounts and perform a preliminary audit of groundwater production reporting to determine the scope of potential discrepancie*s.

Response to Oxnard's Comment #2: Periodic reviews and updates to both the VRGM and the Plan are now a strategy and action item in the Plan (Section 11.3.1). More frequent changes or additions to the Management Plan and/or changes to the model could be performed at the Board's discretion, although additional funding may need to be obtained for such efforts.

The final Plan contains a discussion of verification of extraction reporting as a management strategy as well as a proposed procedure for verification. Verification of extraction reporting coupled with revised model inputs represents a fundamental step to enhancing the accuracy and effectiveness of the model. Both are addressed in the final Plan.

FCGMA staff has, and continues to, work diligently on an ongoing basis to identify, research, and, to the extent practical, correct extraction reporting anomalies. Fundamentally, the current system relies on the honesty, forthrightness, and diligence of individual well operators. Given that the Agency has limited resources, the FCGMA will need to continue to rely on self-monitoring reports from the operators, education efforts highlighting the need for accurate reporting, and the contributions of its member agencies to enable it to capture the most accurate data available.

3. Oxnard's Comment: *The Draft Plan sets forth several potential future management strategies that should be further explored for their potential effectiveness in addressing seawater intrusion and other adverse hydrogeologic conditions. We recommend that the next draft of the Plan prioritize these potential future strategies in terms of their potential effectiveness. We further recommend that the FCGMA develop procedure to apply a cost/benefit analysis to determine which of the prioritized strategies should be implemented.*

Response to Oxnard's Comment #3: The final Plan (October 2006) prioritizes groundwater management strategies as suggested. At the March 2007 special Groundwater

Management Plan Workshop, the FCGMA staff introduced a proposed implementation approach that involves both technical and strategic advisory groups that would work together to evaluate each of the groundwater management strategies on both a technical and a cost/benefit basis. These groups will subsequently provide recommendations to the Board.

4. ***Oxnard's Comment:*** *As a general matter, we also encourage the FCGMA to consider more dynamic use of aquifers with dewatered storage space as a potential resource for future conjunctive use programs. Other basins, such as the Chino and Orange County basins, are currently planning and using available dewatered storage space for local and regional conjunctive use programs that yield better water supply reliability and financial benefits to support other necessary basin management programs. The FCGMA could pursue similar programs. There are numerous hydrogeologic and policy matters that must be resolved to implement a large scale groundwater storage program. Still, we recommend that the Plan include additional and more detailed discussion of potential opportunities for active conjunctive use programs within the FCGMA area.*

Response to Oxnard's Comment #4: The final Plan includes several strategies that utilize existing aquifer space for storage including the Oxnard Plain Forebay Basin (Sections 9.6.6, 10.1.5, 10.2.2), the South and East Las Posas Basins (Sections 9.2, 10.1.7, and 10.1.10) and the Pleasant Valley Basin (Sections 9.3, 10.1.7, and 10.1.10) In addition, the use of recycled water for injection is discussed in Section 9.1. Ultimately, the technical and cost/benefit of each of these strategies will have to be evaluated by the advisory group(s) and recommended to the Board for implementation.

FCGMA responses to written comments submitted on behalf of Pleasant Valley County Water District (PVCWD) by:

Mr. John Mathews
Arnold, Bluel, Mathews, & Zirbel, Attorney's at Law, LLP
Oxnard, CA
Legal Counsel for Pleasant Valley County Water District
Camarillo, CA

1. ***PVCWD's Comment:*** *Under the section "Groundwater Extractions", in the third paragraph it refers to increased agricultural efficiencies. We believe that somewhere in this paragraph reference should be made to the fact that extractions from the groundwater may have also decreased because increased yields from the Freeman diversion and the Conejo Creek project.*

Response to PVCWD's Comment #1: A sentence has been added as suggested.

2. ***PVCWD's Comment****: On page 43, in the section entitled "Assessment of Basin Management Objectives", in the second paragraph it refers to Basin Management Objectives (BMO's) for groundwater levels in the Pleasant Valley basin. In table 3, it makes reference to Basin Management Objectives in the Pleasant Valley area, but does not set forth what the current levels are, it would be helpful to state the groundwater BMO's.*

Response to PVCWD's Comment #2: Current levels have been added to all the BMO tables.

3. ***PVCWD's Comment:*** *On page 48, under the Section "Contingency Plan for LAS Seawater Intrusion", it states that the GMA staff has developed a contingency plan to address the intrusion of seawater into the LAS. It would be helpful if drafts of that Contingency Plan could be made available for public review.*

Response to PVCWD's Comment #3: As stated in the final Plan (Section 8.1), no formalized Contingency Plan for LAS Seawater Intrusion exists. The original FCGMA Groundwater Management Plan completed in September 1985 contained a list of countermeasures that could be employed either temporarily or for longer periods of time to offset an extreme and threatening loss of fresh water resources. Some of the schemes listed, such as a complete ban on all future LAS wells, forced urban and farm water conservation, or monetary incentives to encourage destruction of LAS wells, have limited feasibility at the present time. Others such as implementing voluntary conservation measures, changing the County Well Ordinance to limit new LAS wells, and additional monitoring efforts either proposed in the current plan or already under development.

4. ***PVCWD's Comment****: On page 50, under the Section "Conejo Creek Diversion Project", the last sentence references that over the "net 20 years" that the yield of the diversion might decrease. There obviously is a spelling error there in that the word "net" should be "next". Furthermore, input should be sought from Camrosa Water District to determine whether or not their proposed plans will in fact reduce yield to Pleasant Valley. In discussions with Richard Hajas, it is our understanding that Camrosa's intent is to continue to provide current levels of diverted water to Pleasant Valley and in fact yields may be increased.*

Response to PVCWD's Comment #4: The typo has been corrected. The information in this Section was based on a conversation with Camrosa staff, who emphasized that yields of the Conejo Creek diversion project may not always be available to PVCWD.

5. PVCWD's Comment: *Under the Section "Great Project (Recycled Water)", the first paragraph makes reference to the delivery of recycled water to the Pleasant Valley area. PVCWD has continued to express their concerns to the City of Oxnard about the suitability of the recycled water for agricultural use. In particular, Pleasant Valley is concerned about the "stigma" that recycled water has in the market place. Many growers are now required to provide information on the source of their irrigation water. In the event that recycled water is used, the agricultural produce is often downgraded.*

Also, Pleasant Valley has concern about the injection of recycled water into the LAS. Injection into the LAS is discussed on pages 65 and 66 (June 2006 Draft Plan). Because the LAS is the only groundwater source for the PVCWD, Pleasant Valley will closely scrutinize any injection of recycled water into the LAS. We feel that a better alternative to injection would be the transportation of the recycled water to the spreading grounds. This would enhance recharge and remove concerns relative to injection.

Response to PVCWD's Comment #5: The use of reclaimed water, as well as most or all of the proposed strategies will need to be analyzed for both technical feasibility and cost/benefit considerations prior to implementation. At that time, the proposed alternative, as well as other alternatives, will be considered. Indeed, the purpose of the advisory groups proposed by the FCGMA Staff at the March 2007 Special Groundwater Management Plan Workshop is to evaluate both the Plan-proposed and alternative groundwater management strategies.

With respect to the specifics of your proposal, the alternative to injection suggested above has two major drawbacks:

1) Reclaimed water recharged in the spreading grounds is not as quantitatively effective or efficient in recharging the Lower Aquifer on a unit for unit basis as using the water in place of extracted groundwater or injecting water directly into the areas with lowered groundwater levels; specifically, the south Oxnard Plain and Pleasant Valley basins; and

2) Reclaimed water delivered via pipeline to the spreading grounds would trigger a host of California Department of Health Services (DHS) requirements, including a zone surrounding the spreading grounds where no groundwater could be pumped for potable use. The DHS requirements for the spreading grounds with piped reclaimed water could significantly alter United Water's operations of the spreading grounds. Any directly injected recycled water would be subject to existing or future DHS stringent water quality standards for domestic consumption, which are very stringent.

6. PVCWD's Comment*: Under the Section "Non-Export of FCGMA Water", the last paragraph on that page states "It appears that current ordinances and policies of the FCGMA are sufficient to deal with its export issue." In light of recent issues, the ordinances of the GMA should be reviewed again to make sure that they are adequate to address the export issues. In particular, the enforcement provisions relating to export of "GMA" water should be closely reviewed.*

Response to PVCWD's Comment #6: A discussion about reviewing the sufficiency of current ordinances and policies was added to the Plan in Section 10.1.8.

7. PVCWD's Comment*: Under the Section "Increase Diversions from Santa Clara River, Potential Effectiveness". the first sentence states "The Santa Clara River remains a primary recharge source for the Oxnard Plain and Pleasant Valley basins." Based upon our understandings of various studies, it is a little misleading to suggest that the Pleasant Valley* *basin gets much recharge from the Santa Clara River. Although there may be some recharge, even that is disputed, it is clear that the amount of recharge is minimal at best.*

Response to PVCWD's Comment #7: PVCWD's comment has merit and the corresponding text has been amended to indicate there is some uncertainty with regards to the quantitative contribution of the Santa Clara River to the southern portion of the Oxnard Plain Pressure Basin and the Pleasant Valley Basin. However, the Santa Clara River likely provides significant recharge to the northern Oxnard Plain Pressure Basin. It is probably not accurate to portray the recharge going to Pleasant Valley from the Santa Clara River as "minimal at best." Although recharge to this basin is hampered by the zone of lower conductivity (fault?) that separates it from the Santa Clara River, there is still recharge moving across the zone. The river also alleviates the need for some recharge through the pipeline delivery of surface water as a replacement for extracted groundwater.

8. PVCWD's Comment*: Under the section "Shelf Life for Conservation Credits", it is Pleasant Valley's opinion that at the present time there is no need for "sunsetting" of conservation credits. While conservation credits have been built up by not only Pleasant Valley, but other entities, it was the very purpose of allowing for conservation credits so that the credits could be retained and used for future needs. Pleasant Valley sees no present need to "sunset" the conservation credits. Credits would only be used when there was inadequate surface water from the Freeman Diversion and the Conejo Creek Project, and pumping from our wells were insufficient to meet our needs. Putting a shelf life on credits seems to suggest that Pleasant Valley would utilize their credits to over-pump and waste water.*

It is also our opinion that putting a shelf life on credits, will also remove incentives to look for creative water solutions. For example, much of the impetus for Pleasant Valley to participate in the Conejo Creek Project, was the fact that credits would be generated.

Response to PVCWD's Comment #8: Your comments are noted. Currently, there are no restrictions on the use of conservation credits, thus there is significant potential for over-use of the groundwater resource through the conservation credit program. The "sunsetting proposal" has been one of several proposals advanced by FCGMA stakeholders to mitigate the potentially negative consequences of the current credit program. Ultimately, current program will need to be evaluated in the context of the groundwater conditions and other groundwater management strategies to determine its potential benefit/consequences.

FCGMA responses to written comments submitted on behalf of Saticoy Country Club (SCC) by:

Mr. John Powell, Water Committee Representative
Saticoy Country Club

1. ***SCC's Comment:*** *Continuation of 25% Pumping Reduction. SCC supports all efforts to bring the basins into safe yield and we not only have committed to reduce our overall pumping but we also have committed significant capital resources to increase our efficiencies. As briefly described above we have made a significant efficiency effort already through our infrastructure alterations and water management practices and will continue that effort in the future. As such it is our opinion that to continue the phased reductions to the full 25% reduction (with possible further reductions) only to M&I users is unfair and that the Draft Management Plan Update should either include provisions to reward increases in efficiencies by M&I users and/or to implement additional productive measures to also reduce agricultural pumping. Agricultural users consume far more of the resource and it is completely unfair to place the burden of balancing the basin on the M&I users.*

Response to SCC's Comment #1: Your comments and continuing conservation efforts are very much appreciated. As a point of clarification, the proposed further reductions in groundwater extraction under historical allocation are **not** limited to M & I Operators as suggested by your comment. Other extraction reduction strategies included in the final Plan include a change to the Irrigation Efficiency Calculation (Section 10.1.9) and Additional Water Conservation strategies (Section 10.1.12). A generic discussion of M&I and agricultural conservation efforts has been added the final Plan (Section 4.0).

One of the somewhat surprising conclusions that resulted from the many computer modeling scenarios was that implementation of the remaining two 5% scheduled reductions in Historical Allocations would not eliminate the overuse of groundwater resources within the FCGMA. Thus, reduction of allocation will have to be considered in conjunction with other groundwater management strategies. Ultimately, the responsibility for efficient and effective groundwater use falls on all of the FCGMA stakeholders.

2. ***SCC's Comment: Shelf Life for Conservation Credits.*** *We understand the potential concerns of accumulating Conservation Credits with no expiration date and that this accumulation effectively has left a large theoretical pumping debt on the aquifers. Sunset provisions may be warranted in many cases. Our initial concerns with this proposed provision alteration is how it may impact different size users and also the potential for removal of credits earned through our continued efficiency improvements.*

Response to SCC's Comment #2: As noted in a response to similar comments, there are no restrictions on the use of conservation credits, thus there is significant potential for over-use of the groundwater resource through the conservation credit program. The "sunsetting proposal" has been one of several proposals advanced by FCGMA stakeholders to mitigate the potentially negative consequences of the current credit program. As part of the implementation of the Plan, both the quantitative contribution and cost/benefit of all groundwater management strategies will be evaluated as part of the development process.

FCGMA responses to written comments submitted on behalf of the City of Camarillo (Camarillo) by:

Ms. Lucia McGovern, Deputy Public Works Director
City of Camarillo

1. ***Camarillo's Comment:*** *Page 58* (of the June 2006 Draft Plan Draft Plan) *indicates the following, "the City of Camarillo is considering a strategy to move some of its current pumping from the area of the LAS pumping depression beneath Pleasant Valley to this area of poorer-quality rising groundwater. Under this plan, the poorer-quality water would be extracted and desalted in a similar manner to the South Las Posas Basin project approved by the FCGMA."*

   Recommended Action: Consider replacing this text with the following, "The City of Camarillo has assessed the feasibility of constructing a Groundwater Treatment Facility that would be located in the Somis Gap area of the Pleasant Valley Basin (Black & Veatch, August 2005). The study determined the project to be technically feasible and would allow Camarillo to halt pumping from an area of the LAS with depressed groundwater levels and instead pump in an area of rising groundwater levels. This plan is similar in nature to the South Las Posas Basin project, which was previously approved by the FCGMA Board and consistent with policy to move pumping to areas of known substantial recharge (i.e., Oxnard Forebay) which will create more storage space for future recharge events. The City of Camarillo proposes to coordinate pumping strategies between various stakeholders in the neighboring sub-basins in order maintain replenishment of the Pleasant Valley Basin."

<u>Response to Camarillo's Comment #1</u>: Some of this language has been added to the final Plan. Parenthetically, moving pumping away from Camarillo's airport wells has been simulated using the Ventura Regional Groundwater Model, with results discussed in Appendix B of the revised report and included in the discussion of this particular management strategy.

As a point of clarification, the Board **has not**, in fact, approved any plan for pumping without allocation in the South Las Posas Basin, although the Board has addressed the potential for consideration of such a plan. Specifically, Resolution 2003-03 states that "an allocation for pumping from the South Las Posas Basin may be changed or altered to accommodate a responsible entity that submits **a plan** to render this groundwater usable"[*] To date, no specific plan has been approved through ordinance or resolution by the Board.

2. ***Camarillo's Comment****: The majority of the discussion on page 58 focuses on the development of brackish groundwater in the LAS of the Pleasant Valley Basin by means of Camarillo's Groundwater Treatment Facility project. However, the third paragraph awkwardly mixes in a brief discussion of an alternate subject in an area of the Pleasant Valley Basin that is far away from the observed recharge in the Forebay.*

   Recommended Action: Please elaborate on the significance of this paragraph to Camarillo's Groundwater Treatment Facility Project or relocate this paragraph to an alternate location to maintain the continuity of the discussion regarding Camarillo's Groundwater Treatment Facility project which is in the Forebay.

[*] FCGMA, 2003. Item 4: Minutes of the October 22, 2003 Board Meeting *<u>in: Full Agenda for the December 17, 2003 FCGMA Board Meeting.</u>*

<u>Response to Camarillo's Comment #2</u>: The paragraph has been revised to reflect this comment, however we cannot agree with Camarillo's use of the term "Forebay" when discussing a possible unconfined area near the town of Somis at the northeastern corner of the Pleasant Valley Basin. There is at present, no comprehensive and conclusive evidence to support the concept that this area acts like a "Forebay" from a hydrogeologic standpoint. Further, the use of this term could be misleading when used in context with the rest of the FCGMA Management Plan where "Forebay" refers to the Oxnard Plain Forebay Groundwater Basin adjacent to the northern end of the Oxnard Plain Pressure Groundwater Basin.

3. ***Camarillo's Comment:*** *Page 17 (June 2006 Draft Plan) provides the following description of the Pleasant Valley Basin, "Despite the fault barrier to the west, the LAS is in hydrologic continuity with the adjacent southern portion of the Oxnard Plain Basin, which is the primary recharge source for the Pleasant Valley Basin."*

   Two paragraphs later, the following is stated, "At the northeast edge of the Pleasant Valley basin, where Arroyo Las Posas flows cross the basin boundary, increased flows in the arroyo have apparently percolated directly into the LAS, significantly raising groundwater levels in City of Camarillo wells. This recharge suggests that this portion of the Pleasant Valley Basin is unconfined, contrary to current understanding of the basin. "

   Recommended Action: Consider the following definition of the Pleasant Valley Basin and explanation of recharge sources for this basin:

   Historically it was assumed that the LAS of the Pleasant Valley Basin was relatively confined and received little overall recharge. This assumption was based on the understanding that the primary recharge source for this basin was from the adjacent Oxnard Plain Basin to the south and recharge potential between these basins was low due to the low permeability of the Pleasant Valley Basin aquifer in this region, as well as the presence of a fault barrier in the lower portions of the Oxnard Plain. However, since the early 1990s, water levels have begun to rise in the northern adjacent basins. The City of Camarillo has two existing wells in .the northeast portion of the Pleasant Valley Basin (hereafter called the Somis Area) and these wells confirm that rising water levels in northern adjacent basins directly impact recharge rates, water quality, and water levels in the Somis Area.

   The recharge in the Somis Area (Pleasant Valley Forebay) may be a result of the Saugus Formation being folded upward and subsequently eroding away in the Somis gap area covering the underlying bedrock with a predominantly sandy alluvial layer that allows rapid stream flow percolation. If this theory is correct, it is also likely true that the primary source of recharge for the Pleasant Valley Basin prior to the decline of the water levels in the adjacent northern basins was a forebay in the Pleasant Valley Basin and this primary recharge source is again prevalent due to the recent rise in water levels in the northern basins. It is recommended that additional monitoring and studies be conducted to determine if this theory is correct."

   Figure 1 illustrates the conceptual location of the Pleasant Valley Forebay.

<u>Response to Camarillo's Comment #3</u>: Much of this suggested language has been included in the final Plan (Section 3.0). Section 3.0 significantly revises the text to indicate the degree of uncertainty in this area with respect recharge and hydrogeology. There is agreement that the northern portion of the Pleasant Valley basin south of Somis needs to be better understood and there is significant recharge occurring in this area of the basin. The details of how this recharge impacts the main portion of the Pleasant Valley basin needs further evaluation, with the result of the study integrated into the conceptual geology of the Ventura Regional Groundwater Model.

The term "Pleasant Valley Forebay" is not used for the reasons cited in the response to the previous Camarillo's Comment #2.

4. ***Camarillo's Comment****: Page 58 (June 2006 Draft Plan) indicates the following, "Base flow from the Arroyo Las Posas has migrated completely across the South and East Las Posas Basins and into the northernmost Pleasant Valley Basin, providing a source of new recharge to this portion of the Pleasant Valley Basin. Coordination in pumping strategies between the sub-basins is recommended in order to avoid negatively impacting groundwater levels in the Fox Canyon Groundwater Basin." As stated in Camarillo's Comment #3, this may not be a "new" source of recharge but instead reestablishing of an old source of recharge to the Pleasant Valley Basin.*
Recommended Action: Consider revising the text to indicate that the Somis Gap was potentially the primary recharge source for the Pleasant Valley Basin prior to pumping activities in the northern adjacent basins.

Response to Camarillo's Comment #4: See our response to Camarillo's Comment #3 above. Section 3.0 significantly revises the text to indicate the degree of uncertainty in this area with respect recharge and hydrogeology.

5. ***Camarillo's Comment:*** *The Draft GMP does not segregate the Pleasant Valley Basin into sub-basins, it only describes the basin as a whole. Furthermore, the last sentence of the second paragraph of page 17 (June 2006 Draft Plan) indicates a lack of current understanding of this basin.*
Recommended Action: Please elaborate on the current understanding of the Pleasant Valley Basin and clarify how the basin is currently handled in the model. It is also recommended that the authors consider sub-dividing the Pleasant Valley Basin into sub-basins (Pleasant Valley Forebay and Pleasant Valley Basin) to assist in evaluating the different potential recharge sources for the basin.

Response to Camarillo's Comment #5: See responses to the previous two Camarillo's Comments.

6. ***Camarillo's Comment****: The second paragraph on page 33 (June 2006 Draft Plan) indicates groundwater levels in the LAS have consistently been below sea level in the Pleasant Valley Basin. This is not true across the entire basin.*
Recommended Action: Clarify that water levels in the southern portion of Pleasant Valley Basin have historically been below sea level since the 1950's. However, water levels in the northeastern portion of the basin near the Somis gap have historically been above sea level and continue to rise along with levels in the adjacent northern basins.

Response to Camarillo's Comment #6: The text has been amended appropriately in the final Plan.

7. ***Camarillo's Comment****: The last sentence of the second paragraph on page 29 (June 2006 Draft Plan) states that: "It is too early to know whether chlorides in the Pleasant Valley Basin will escalate to a problem affecting local pumpers." This sentence is restated in the third sentence of the second paragraph on page 35. In both places it should be noted that two City of Camarillo wells (Wells A and B) have already been impacted by a rise in chlorides, which has prompted the City to discontinue use of Well A and to blend water from Well B with higher quality imported water to meet drinking water standards.*
Recommended Action: Revise the referenced sentences to indicate that chloride levels in the southern portion of the basin have risen marginally from rising water levels, but due to limited data, the marginal rise of chloride levels could be much higher. However, as shown on Figure 14 of the draft GMP, sulfate and TDS levels in the northern portion of the Pleasant Valley Basin have been rising steadily and have already exceeded secondary drinking water standards. Available data also indicate that concentrations of iron and manganese are also

rising in response to basin recharge and have risen to levels that impair M&I uses.

Response to Camarillo's Comment #7: The text has been amended appropriately in the final Plan.

8. ***Camarillo's Comment****: Page 35 (June 2006 Draft Plan) provides discussion on increasing sulfate and chloride levels in the northern Pleasant Valley Basin and indicates water treatment will be needed for potable or irrigation use.*
   Recommended Action: Consider expanding the discussion to include the following text: "Camarillo has evaluated the feasibility of constructing a Groundwater Treatment Facility that would intercept a portion of the poorer water quality surge and remove salts from the aquifer system. This would help protect the water quality in the southern portion of the basin and preserve higher quality water for use by other pumpers in areas of major overdraft. Furthermore, by utilizing the water from the Groundwater Treatment Facility, Camarillo could curtail or eliminate pumping operations in the southern portion of the Pleasant Valley Basin, which would promote recovery of the depressed water table in that region. Further details of the project are provided in the Section titled, Development of Brackish Groundwater, Pleasant Valley Basin."

Response to Camarillo's Comment #8: Appropriate language has been added to Section 5.2.3 and Section 9.3 of the final Plan. Based on the data and analyses available at this time, it is not known whether a groundwater treatment facility in the northern half of the Pleasant Valley basin would necessarily help to protect water quality in the southern portion of the basin. There is also significant potential for increased pumping associated with a treatment facility to worsen water quality in the southern portion of the Pleasant Valley Basin. Given that there is limited study and data on the area and no quantitative analysis regarding such a system, any statements regarding its success or failure are speculative.

9. ***Camarillo's Comment***: *The second sentence of the last paragraph on page 43 (June 2006 Draft Plan) indicates, "Basin Management Objectives (BMO's) for chloride concentrations in the Pleasant Valley Basin are currently being met, although chlorides are rising slowly in a few wells in the basin."*
   There are a number of wells that indicate that the BMO's are not being met. For example, County data indicate that well 01N/21W-01B04 screened from 820 to 1,150 feet has chloride greater than 200 mg/l, well 01N/21W-03C01 is screened from 956 to 1,216 feet has chloride greater than 260 mg/l, and well 01N/21W-01D02 is screened from 107 to 437 feet with chloride greater than 450 mg/l.
   Recommended Action: Consider revising the statement to indicate that BMO's are not currently being met throughout the entire Pleasant Valley Basin.

Response to Camarillo's Comment #9: The text has been amended appropriately in Section 6.2 of the final Plan.

10. ***Camarillo's Comment****: The first sentence of the last paragraph on page 58·(June 2006 Draft Plan) indicates, "Under current FCGMA policy, City of Camarillo pumping of poor-quality groundwater along Calleguas Creek would have to be pumped using existing allocations if the well was within the FCGMA boundary." The City of Camarillo understands that current FCGMA policy has evolved over time and has previously allowed unrestricted pumping of poorer quality shallow groundwater, with the semi-perched zone in the Oxnard Plain and the South Las Posas along the Arroyo being two examples.*
    Recommended Action: .Consider revising the last paragraph of page 58·(June 2006 Draft Plan) to say: "Previously, City of Camarillo pumping of poor-quality groundwater along Calleguas Creek would have to be pumped using existing allocations since the wells are within the FCGMA boundary. However, as FCGMA policy has evolved over time,

unrestricted pumping of poorer quality shallow groundwater has been allowed. For the Camarillo Project, a coordinated effort between the FCGMA and City of Camarillo should be undertaken to define the potential benefits of operating the City of Camarillo Groundwater Treatment Facility. Extractions of poor-quality water without allocations are discussed in more detail in the Section titled "Recommended Additions to FCGMA Policies."

Response to Camarillo's Comment #10: This comment is addressed in Section 9.3 of the final Plan. A formal written policy that includes criteria for these types of projects is recommended as an addition to FCGMA policies.

With regard to other as aspects of this comment, there are two points of clarification. First, no actual pumping of poor-quality shallow groundwater has been authorizes by the FCGMA to date without an existing allocation. Resolution No. 98-1 provides for construction dewatering without an established allocation since such work is typically short-lived and occurs in the shallow subsurface. Resolution No. 99-3 allowed for unrestricted pumping of "mounded groundwater" within the Oxnard Plain Forebay Basin without an allocation, but only under very specific terms and conditions that to date, have never been met or authorized. Second, the Board **has not**, in fact, approved any plan for pumping without allocation in the South Las Posas Basin although the Board is willing to consider the submittal of a plan. Specifically, Resolution No 2003-03 states that "an allocation for pumping from the South Las Posas Basin may be changed or altered to accommodate a responsible entity that submits a plan to render this groundwater usable"[*] To date, no specific plan has been approved through ordinance or resolution by the Board.

***11. Camarillo's Comment**: The last 3 paragraphs on page 23 (June 2006 Draft Plan) discuss groundwater extraction reduction. The numbers presented in the second paragraph in this Section indicates that the total reduction in pumping is about 22 to 23 percent. The next paragraph indicates that the largest decrease in pumping is from agricultural uses, while the last paragraph indicates that the first phase of the FCGMA enforced pumping reductions of 15 percent resulted in the reduction of 8,300 acre-feet of pumping by the M&I users. However, the discussion on the reduced pumping does not appear to reflect the transfer of allocation from agricultural uses to M&I service, or the fact that while some M&I providers are using all their allocation, others have been conserving them for conjunctive use with other sources. We believe that the apparent 15 percent reduction in pumping is somewhat coincidental and that the overall M&I allocation for groundwater use has increased substantially due to land use conversion.*

Recommended Action: This discussion should compare the changes in acreage irrigated and M&I acreage served over the same time period that pumping reduction has occurred. This may also be the place to discuss the likelihood that under recording meters, or agricultural wells with no meters at all, may be contributing to the apparent reduction in reported agricultural pumping.

Response to Camarillo's Comment #11: The discussion of groundwater extraction has been expanded significantly and is located in Section 4.0 of the final Plan. The issue of potential under-reporting of groundwater extractions is addressed in Section 10.1.6 and Section 11.3.9 of the final Plan. In addition, an additional modeling scenario was performed to address potential under-reporting of groundwater extractions. A discussion of the results is provided in Section A.2.2.2 of Appendix B.

[*] FCGMA, 2003. Item 4: Minutes of the October 22, 2003 Board Meeting *in: Full Agenda for the December 17, 2003 FCGMA Board Meeting.*

12*. *Camarillo's Comment: *The second paragraph of page 52 (June 2006 Draft Plan) implies that there is a universal acceptance of the pumping reductions and the stiff penalty for over pumping. The City of Camarillo doesn't agree that there is a universal acceptance of the pumping reductions. It is the City's view, as well as other M&I users, that the reduction is not equitable and recommends that the efficiency policy be reviewed in conjunction with production meter testing activities.*

Recommended Action: Consider revising the text to indicate there may be general acceptance of the pumping reduction policies but not universal agreement. The reduction policies should consider equal distribution in sharing the burden in resolving water level deficits in the basins.

Response to Camarillo's Comment #12: The language has been revised to reflect general, but not universal, acceptance of mandated or scheduled Historical allocation reductions.

13*. *Camarillo's Comment: *The third paragraph on page 59 (June 2006 Draft Plan) states that the baseline allocation is two acre-feet per acre. The City of Camarillo understands that the two acre-feet per acre may have been the historical allocation, not the baseline allocation. Baseline allocation is only one acre-foot of water per acre, and should be considered when analyzing the baseline allocation policies.*

Response to Camarillo's Comment #13: The baseline allocation number as stated has been corrected to one acre-foot per acre as provided by Section 5.6.1.1 of FCGMA Ordinance No. 8.1.

1*4. Camarillo's Comment:* *Page 63 (June 2006 Draft Plan) provides a discussion on the potential effectiveness of importing additional state water. Further clarification of this paragraph would be very helpful in understanding this potential strategy.*

Response to Camarillo's Comment #14: A discussion of the potential effectiveness of importing California State Water is provided in Section 10.2.2 of the final Plan. The potential effects of importing California State Water was also addressed as a model scenario using the VRGM and is discussed in Section A.2.2.7 of Appendix B.

15. Camarillo's Comment: *Page 73 (June 2006 Draft Plan) provides a discussion on penalties used to purchase replacement water. It should be noted that a large percentage of overpumping is by agricultural users who have the ability to escape penalties by switching to irrigation efficiency and consequently the revenue from these fees has historically been very little. Therefore, using this revenue to purchase replenishment water may be of little benefit to the basins.*

Response to Camarillo's Comment #15: The comment is noted.

1*6. Camarillo's Comment:* *Page 79 (June 2006 Draft Plan) includes a Section on "Extractions of Poor-Quality Water Without an Allocation", which would be an addition to current FCGMA policy. The City of Camarillo supports such a strategy that allows projects that would benefit the overall aquifer system. The City of Camarillo would like to see this policy implemented and would appreciate the opportunity to review the draft policy.*

Response to Camarillo's Comment #16: Please see the response to Camarillo's Comment #10 above.

17. Camarillo's Comment: *FCGMA has reduced pumping and approved projects that provide some benefit to some portion of aquifers within the agency boundaries. However, this does not promote the implementation of projects in critical areas of the basin that are just outside of agency boundaries. Before implementing the next stage of pumping reductions on M&I users, the City of Camarillo recommends that the FCGMA evaluate larger picture projects* *that could help solve groundwater impacts in the most critical areas and potentially provide solutions in-lieu of additional pumping reductions. Further pumping reductions could possibly be avoided if the current basin by basin management approach was revised and strategies were implemented based on the principal that downstream basins are impacted by upstream uses and that the impact is therefore created by both agricultural and M&I users who pump from all basins.*

FCGMA could consider implementing a "mitigation fee" of approximately $10/AF that would be paid by all groundwater users in the FCGMA. This strategy would allow funding for agencies like UWCD, Oxnard, or Calleguas MWD to develop projects that would effectively improve the conditions of the basins as a whole by moving water to over pumped areas within FCGMA boundaries. This approach would help prevent basin by basin management which could inordinately impact users in downstream basins, like the City of Camarillo.

Response to Camarillo's Comment #17: Section 11.1 of the final Plan proposes that there be a dialog on strategic planning within the water community that would discuss specific projects and project proposals. FCGMA staff has proposed a Plan implementation strategy that not only provides for, but encourages, significant stakeholder contribution and input. There are some inherent limitations to the influence of the FCGMA. The enabling legislation for the FCGMA limits its ability to influence projects and conditions outside its boundary. The opportunity to expend FCGMA funds outside its boundary is also limited.

18. Camarillo's Comment: *The City of Camarillo is under the impression that there is a quantifiable amount of groundwater being exported outside the FCGMA boundary from Pleasant Valley and Las Posas Basins. The City of Camarillo would recommend that FCGMA pursue controlling the exportation of groundwater before additional pumping reductions are approved.*

Response to Camarillo's Comment #18: The exportation of groundwater outside the FCGMA boundary is addressed in Section 9.4.

19. Camarillo's Comment: *The Draft GMP indicates that FCGMA is considering expiring accumulated groundwater credits. It should be noted that M&I users conjunctively balance surface water and imported supplies with local groundwater thereby conserving groundwater for use when surface and imported supply is not available. Therefore, setting a time limit on credits works against this water supply management philosophy. Credit reduction is an issue that should be reviewed separately for M&I uses and agricultural uses. Similar to implementing 25 percent pumping reductions, credit reductions would only impact M&I agencies who conduct long-term planning, since agricultural users could go on efficiency allocation and would not be impacted by a loss of credits. M&I users do not have this option.*

In regards to agricultural credits, please note that UWCD surface water deliveries have in part allowed accumulation of credits by agricultural users that receive surface water for irrigation. Those who funded the Freeman Diversion have in part funded the accumulation of these credits when surface deliveries were annually increased. The credit reduction strategy is believed to be of very little benefit to the overall basins but would have a significant impact to M&I users. If there is a desire to eliminate the perceived "groundwater debt", agricultural credit reduction should be the first consideration.

Pages 71 and 72 (June 2006 Draft Plan) state that there are tens of thousands of acre-feet of accrued conservation credits. The credits that the City of Camarillo has accrued came at a high cost, when we purchase more expensive imported water. Poor quality groundwater has forced the City of Camarillo to blend groundwater with imported supplies, subsequently accruing groundwater credits. The City of Camarillo intends to retain its credits until such time they are needed to meet demands during a drought. Even though credits cannot be *sold, they have a value to M&I users that is equal to the over pumping surcharge. FCGMA should reconsider the proposed strategy of expiring/reducing M&I groundwater credits.*

Response to Camarillo's Comment #19: The issue of M&I accrual of credits as well as the "shelf-life" for conservations credits is discussed in extensive detail in Section 10.1.13 of the final Plan.

20. Camarillo's Comment: *Page 73 discusses proper filling and capping of abandoned or leaking wells and states that FCGMA helps with the costs associated with well abandonment. The owner of the land that the well is on should be responsible for costs associated with destruction of well(s).*

Response to Camarillo's Comment #20: It is true the owner of the land is responsible for well destruction. Historically, the City of Oxnard, United Water, and the FCGMA have each provided funding to destroy wells for a variety of reasons including urgency, difficult access, threats to water supply, and inability to find former owners. The Ventura County Watershed Protection District - Groundwater Section has pursued the destruction of 40 to 50 abandoned wells per year over the last several years at the property owner's expense without FCGMA financial assistance.

21. Camarillo's Comment*: Page 75 (June 2006 Draft Plan) provides a discussion of additional reductions in pumping allocations. It is recommended that further reductions not be implemented until after the meter testing effort is complete. Perhaps FCGMA should require an initial testing of all meters within one year. This would be very beneficial to the modeling effort because the model will only be as accurate as the information used to develop it.*

Response to Camarillo's Comment #21: The groundwater management strategy of reducing extraction allocations is discussed in extensive detail in Sections 9.5, 10.4.1, 11.2.1, 11.3.10, and Appendix Section A.2.2.3 of the final Plan. The verification of extraction reporting is discussed in detail in Sections, 10.1.6, 11.3.9, and in Appendix Section A.2.2.2.

Many different and independent analyses performed over the last four years as well as years of historic documentation demonstrate nearly all of the aquifers of the FCGMA are in a state of overdraft. Two FCGMA Staff reports prepared since October 2006, the *FCGMA 2005 Annual Report*, the output of the VRGM (Appendix B to the final Plan), and the UWCD's *2003 Coastal Saline Intrusion Report, Oxnard Plain Ventura County, California* universally identify extraction of groundwater beyond a level the resource can support as the sole reason for depressed groundwater elevations, seawater intrusion, and water quality degradation throughout the FCGMA. Thus, there is an urgent need to implement strategies that both limit use of the resource and provide additional sources of acceptable recharge. While the increased accuracy of extraction reporting may indirectly contribute to better management of the groundwater resource, the overwhelming body of data and analysis supports the conclusion the resource as whole is over-allocated and overused. Delaying the implementation of any strategy that either reduces overuse of the resource or limits the acquisition of additional recharge does not serve either the FCGMA or its stakeholders. Nevertheless, further extraction reduction will be considered in conjunction with other management strategies described in the Plan with the overarching purpose of comprehensively managing the groundwater resource.

FCGMA responses to written comments provided by:
Mr. Lawrence (Larry) Fuller
Land Owner/Well Operator in the FCGMA
Somis, CA

1. ***Fuller's Comment:*** *Examining the FCGMA Management Plan in light of the case CITY OF BARSTOW et al, v. MOJAVE WATER AGENCY (21 August 2000), I believe this case clarifies the California Supreme Court's position on water rights. It is my understanding that the FCGMA used the "equitable" (physical) concept for allocation pumping to all of the Fox Canyon aquifer pumpers. This method of allocation is clearly a violation of the law, if I understand the ruling cited above. The three levels of priority, as stated in the case law, are 1st priority Overlying Owners, 2nd in priority are Appropriators, and 3rd are Exporters. Thus, while the rights of all overlying owners in a groundwater basin are correlative, and subject to cutbacks when the basin is overdrafted, overlying rights are superior to appropriative rights. It is my request that the FCGMA Board of Directors NOT make any further pumping reductions until these legal issues can be resolved. Small water users, Co-ops, and small M&I agricultural systems are not addressed specifically in the Management Plan. In addition, the FCGMA Board has no small operation representative to ensure that their interests and concerns will be heard.*

Response to Fuller's Comment #1: The history and responsibilities of the FCGMA are summarized in Section 2.0 of the final Plan.

The Agency was created by the State Legislature in 1982 [AB 2995] and granted with certain powers and authority to manage groundwater resources. Included in its enabling legislation (now codified as California Water Code Appendix Chapter 121) is the directive to develop, adopt, and implement a plan to control groundwater extractions (Sect 601). It was also granted the power to "Control extractions by regulating, limiting, or suspending extractions form extraction facilities…" [Ch. 121 Sect. 701 (b)]; and the power to "Impose reasonable operating regulations on extraction facilities…"[Ch. 121 Sect. 701(c)]. SB 747 (1991) amended AB 2995 and authorized the FCGMA Board to establish extraction allocations and levy charges for groundwater extraction. Neither the final Plan nor the FCGMA Ordinance No. 8.1 address the issue of water rights, which is beyond the scope of the FCGMA.

The final Plan was prepared to address the future management of the groundwater resource with respect to the needs of all of the FCGMA stakeholders, regardless of size. Since the operational impacts of larger users have a greater impact on the common resource, some priority has necessarily been placed on strategies that effect large-scale extraction or recharge operations. However, almost all of the proposed groundwater management strategies either directly or indirectly affect all users.

With respect to the comment regarding representation, two of the five FCGMA Board positions are established to represent agricultural operators and small water districts.

2. ***Fuller's Comment:*** *According to my understanding, the Calleguas Municipal Water District (CMWD) has been allowed to acquire Fox Canyon aquifer prescriptive pumping rights. The Board has already allowed the injection wells to be drilled and injection of imported water is progressing. It is imperative that CMWD be restricted in writing that they will not be allowed to extract water outside of their injection field.*

Response to Fuller's Comment #2: A discussion of the Las Posas Basin ASR project as well as other proposed aquifer storage projects, a preliminary set of proposed conditions is provided in Section 9.1 and Section 10.1.10 of the final Plan. Specific aspects of the East Las Posas Basin ASR (formerly Identified as the North Las Posas Basin ASR) are provided in Appendix Section A.3.1 of the final Plan.

The FCGMA has no authority in either its enabling legislation or through its Ordinance code to grant prescriptive rights. When the FCGMA Board authorized and approved the East Las Posas Aquifer Storage and Recovery Project (or ASR Program) proposed by CMWD back in February 1994, certain restrictions were placed on both the operational limitations and the water quality alterations that could result. A written list of conditions was attached to the general injection permit authorized by the FCGMA that included but were not limited to volume reporting, monthly water quality reports, water quality restrictions for both imported water and extracted water, total storage limitations, vicinity groundwater conditions reporting requirements, as well as other standards and condition-dependent response actions (Appendix Section A.3.1 of the final Plan). A copy of these standards or conditions is available and included in an official policy sheet entitled "GMA Adoption of Water Quality Standards."

3. Fuller's Comment: *A gallon for gallon or acre-foot for acre-foot of water injected for water extracted allowance associated with the CMWD ASR field should take into account the wetting factor of the dry sands and the drift factor of the water moving through the aquifer. Fluid losses can be substantial due to wetting of a dry formation and losses via underflow out of the basin or injection area. The FCGMA should not be providing free water to CMWD.*

<u>Response to Fuller's Comment #3</u>: The comment regarding the equity of credits for injected water compared to extracted water is addressed in Section 9.1 and Section 10.1.10 of the final Plan. This is one of the many issues to be considered as part of implementation of all FCGMA groundwater management strategies.

4. Fuller's Comment: *The court cases cited should be discussed in detail and rights of prescription should be examined as they might apply or effect FCGMA ordinances, processes or procedures especially in light of recent rulings by the court.*

<u>Response to Fuller's Comment #4</u>: The Agency Counsel, supplied to the FCGMA under contract with the County of Ventura, reviews and provides legal counsel to the Staff and the Board for all decisions, Ordinances, and resolutions with respect to County, State, and Federal Codes. Historically, the Agency has also contracted external legal services to provide advice on both policy and legal issues.

File: GMP
Comments Received

21 East Carrillo Street
Santa Barbara, CA 93101
Telephone: (805) 963-7000
Fax: (805) 965-4333

HATCH & PARENT
A Law Corporation

Robert J. Saperstein

(805) 882-1417
RSaperstein@HatchParent.com

June 22, 2006

Via Electronic Mail

Fox Canyon Groundwater Management Agency
c/o Dr. Steve Bachman
800 South Victoria Avenue, L#1600
Ventura, CA 93009

Re: Comments on Draft Groundwater Management Plan

Dear Steve:

These comments are provided on behalf of the cities of Oxnard and Camarillo, and Crestview Mutual Water Company. Many members of the GMA's M&I Providers Group have also reviewed these comments, but given the short time available, this letter has not been endorsed by any entities other than those listed above.

The M&I Providers group is committed to working with all the interested parties in ensuring that the final, updated GMA Groundwater Management Plan is well-done. The product must be comprehensive, technically well-grounded, and accessible to all the various GMA constituents. This is not a simple task.

GMA staff is also aware that the M&I Provider's Group has hired Curtis Hopkins to provide a peer review of the Management Plan. Curtis and Steve Bachman have already discussed ways in which they might collaborate in making the product meet all our expectations.

The first rough draft presented on June 12, 2006, provides an excellent starting point. Given that this initial draft does not contain the results of the modeling work, these comments are purposely general. When the modeling effort yields results, and the Management Plan is then crafted with more specific recommendations, more specific comments will be provided.

The M&I Providers Group also wanted to express its appreciation for the first workshop conducted on June 15, 2006. It is clear that Steve and the GMA staff have a good plan to ensure that the GMA constituents who chose to be involved will have ample opportunity to influence the content of the plan.

Fox Canyon Groundwater Management Agency
June 22, 2006
Page 2

In no particular order of importance, please consider the following observations and comments regarding the first draft of the Management Plan and the process in getting it completed:

1. GMA Board attendance at the workshops. While we understand the time commitment is extensive, this update to the Management Plan is very important. It will guide GMA policy and decision-making for years to come. We are not sure how the GMA Board can obtain adequate familiarity with all the issues and the constituents' concerns without some attendance at the workshops. No board members attended the first workshop.

2. Executive Summary. This section is written as part introduction and part summary. An Executive Summary is normally drafted when the remainder of the document is complete. Given the length and technical nature of the material, the Executive Summary will be the most important section of the Plan. It may be the only portion of the document many individuals read. It should summarize the purpose, issues and recommendations, once all of the technical work is complete.

3. Acknowledgements. Throughout the document, there is repetitive recognition of United and Calleguas as the two entities who contribute to the GMA. This recognition is limited almost exclusively to these two entities. Either this self-congratulatory language should be eliminated, or there should be proper acknowledgement of the work of all the individuals and agencies who have and continue to contribute to the GMA's success.

4. Modeling. There needs to be a distinct section that better describes the model details used for the technical analysis. This section need not be long, but it should include mention of the software, construction, assumptions and details of the model construct. It ought to give enough information for the technically capable reader to understand its basics.

5. Organization and Redundancy. There is tremendous redundancy in the report. Perhaps with different organization, it could be slimmed down significantly. You might describe the water quality and quantity issues generally applicable to all areas, along with the general concept of basin management objectives. Then discuss all the issues comprehensively, separated for each basin or in some cases regions with multiple basins. As an alternative, some of the nonessential background and detailed technical information might be moved to appendices.

6. Management Strategies: Organization. In a fashion, the Management Plan is really several separate management plans. Perhaps it should be organized by basin for the three content subjects: strategies under development, future strategies and actions to attain BMO's. There may need to be one more general section that addresses those strategies that cross basin boundaries. You may be able to combine all the basin specific discussions in one section for each basin. A couple different organizational approaches might be tested, with the goal of reducing redundancy and volume of text.

Fox Canyon Groundwater Management Agency
June 22, 2006
Page 3

7. Specific strategy: Forebay priorities. The potential over-reliance on the Forebay under certain conditions is acknowledged in the document. However, there is no mention of the importance, from a policy perspective, to establish some hierarchy for use of the Forebay. There will be increasing reliance on the Forebay. To the extent access to the Forebay may be limited under certain conditions; the GMA board must consider limiting certain uses before others.

8. Specific strategy: Transfers across basins. There is no direct mention that transfers (of allocation or credits) from challenged areas to areas of abundance may be the simplest method of mitigating problems. This has been a policy not favored in the past. However, this is an appropriate time to reconsider this question, particularly if the technical analysis suggests that a surgical approach is required to solve certain problem areas.

9. Specific strategy: Ag recycled water use. The draft Plan acknowledges (assumes) that larger volumes of recycled water will be available for Ag use in the future. The assumption is correct that highly purified recycled water will be available and recycled water use could be a very efficient method of solving several regional problems. However, there is some resistance in the Ag community to take direct use of recycled water. The resistance is not over the quality of the recycled water, but over the required reporting to distributors and product buyers that the crop was grown with recycled water. As long as there is the Ag industry perception that recycled water use may harm the user's competitiveness, recycled water will not be widely accepted. The Board may be able to help influence certain industry groups to alter the current reporting requirements that create these problems for individual users.

10. Analytic methodology. There appears to be no intent to model the expected (inevitable) conversion of Ag use to M&I use over the period of the modeling run. Without this detail, the modeling exercise may provide very misleading results. For example, there are several significant Ag to M&I projects that are in the planning stages located in the south Oxnard Plain area, nearby the City's wastewater treatment plant and the military bases. The result of these conversions will be a shift in groundwater use from wells in a highly sensitive area, to City and United wells located far from the coast (and imported water). If the model does not take into account these expected transitions, it will predict a materially different future than that which will occur. In this fashion, the modeling results may be very misleading.

11. Water quality. It is somewhat troubling that the cornerstone of the Plan is the setting of Basin Management Objectives, some of which are water quality objectives. However, the model has no capability to predict water quality changes. Thus, we need to be very careful in how we set and monitor compliance with the Basin Management Objectives.

12. Periodic update. Either as a component of the Plan, or as a Board measure in adopting the Plan, there should be a built in requirement to update the Plan no less than every 5 years. This should not be so difficult if the model proves to be as useful a tool as is expected.

Fox Canyon Groundwater Management Agency
June 22, 2006
Page 4

13. A few detail comments (there are several other nits in the document that we assume will be fixed in future drafts):

a. Pg. 12. There is no such thing as "in-lieu" credits. Ordinance 8 only defines storage and conservation credits. There are special credit transfer agreements/programs the GMA has approved that amount to "in-lieu" transfer of credits, but the term has no meaning in Ordinance 8.

b. Pg. 12. Ordinance 8 requires Ag to demonstrate 80% efficiency, based on the individual crops grown. The Plan does not propose tightening the efficiency percentage as a potential method of reducing water use. Also, the current reporting requirements are not clear in requiring that the efficiency calculation is to be based on irrigated acreage, not total owned property. In some cases, the irrigated acreage may be materially smaller than the property footprint. In that circumstance, the user gets a substantial benefit in reporting efficiency based on the property footprint instead of the irrigated acreage.

c. Pgs. 13, 16. There is no mention of M&I return flows as a source of recharge.

d. Pg. 20. Two different definitions of basin yield are used and overdraft is not defined.

e. Pg. 23. The discussion of the decreasing trend of extractions is incomplete and therefore misleading. As to the Ag side: (1) there is no quantification of the reduction of Ag pumping resulting from reduced acreage in production over the past two decades, and (2) there is no recognition that the initial period against which we are measuring reduced usage was a very dry period. During dry periods, Ag groundwater use tends to be greatest. Since those early years, we have been in a generally wet period. Thus, we would expect a natural reduction in Ag groundwater use simply based on the historical hydrology.

As to the M&I side, there is no quantification of the increase in municipal demand as a result of conversion of Ag use to M&I use. There is no discussion of the relative efficiencies of use of water prior to the imposition of the cutback goals. The implication of the current discussion in the Plan is that Ag has done more than its share and M&I has not. There is insufficient information or analysis for this conclusion or implication. This discussion should either be made complete and correct, or eliminated, especially if policy decisions might be influenced by it.

f. Pg. 29. The discussion of increasing salt concentrations in the Las Posas basins is somewhat conclusory and incomplete. It might help to actually provide the POTW discharge water quality for TDS and chlorides, so that it would be more clear to the reader that the problem is, in fact, generating from aquifer conditions, not discharge water quality.

Fox Canyon Groundwater Management Agency
June 22, 2006
Page 5

The M&I Provider's Group and Curtis Hopkins will continue to be very actively involved in finalizing the Plan. We appreciate the Board's instructions to develop the Plan in an open and interactive environment. Thank you for your consideration of these comments and those that are certain to follow.

Best Regards,

Robert J. Saperstein
For HATCH & PARENT
A Law Corporation

ROB:olr

cc: Board of Directors of Fox Canyon Groundwater Management Agency
Jeff Pratt
David Panaro
M&I Provider's Group

SB 395545 v1:006670.0041

PUBLIC WORKS DEPARTMENT
Water Division
251 South Hayes Avenue • Oxnard, CA 93030-6058
(805) 385-8136 • Fax (805) 385-8137

16 August 2006

Transmitted Via Electronic Mail

Fox Canyon Groundwater Management Agency
c/o Dr. Steve Bachman
800 South Victoria Avenue, L#1600
Ventura CA 93009

Subject: Additional Interim Comments on Draft Groundwater Management Plan

Dear Dr. Bachman:

This letter sets forth additional interim general comments on the Draft Fox Canyon Groundwater Management Agency ("FCGMA") Groundwater Management Plan ("Plan") and the current planning process by the City of Oxnard. A draft of this letter and the substantive comments herein were also discussed at the Municipal & Industrial ("M&I") Providers Group meeting on 15 August 2006. Those in attendance expressed their general support for the recommendations set forth below. We will provide more specific comments when the results of the basin model become available. We understand that the modeling results will be available by the end of this month, and that the draft Plan will be amended to include specific recommendations based upon the results. The M&I Provider's Group and its consultant, Hopkins Groundwater Consultants, will need sufficient time to review the model results and the revised draft Plan when available, so that we can provide meaningful comments.

As an interim effort, we are submitting these additional comments to supplement the comments provided by the City of Oxnard and others by letter, dated 22 June 2006. Our additional interim comments are as follows:

1. At the last workshop on the draft Plan, the group discussed the potential that incorrect assumptions about the quantity of groundwater production could result in erroneous outcomes from the model. Indeed, there is substantial anecdotal evidence that groundwater production reporting may be materially incorrect because of inaccurate meters or other faulty reporting mechanisms. For this reason, we recommend that the model be run to assume a band of uncertainty relating to the quantity of groundwater production within FCGMA. Such sensitivity analysis will help verify the integrity of the model results.

Fox Canyon Groundwater Management Agency
16 August 2006
Page 2

2. As a related matter, the FCGMA will pursue an aggressive review of meter calibrations over the next several years. However, this process is not scheduled to start until 2007 and it will take three years to complete the first cycle. We recommend that the model be periodically rerun and updated with this new, more accurate production data when it becomes available. In the interim, we recommend that FCGMA staff review suspect accounts and perform a preliminary audit of groundwater production reporting to determine the scope of potential discrepancies.

3. The Draft Plan sets forth several potential future management strategies that should be further explored for their potential effectiveness in addressing seawater intrusion and other adverse hydrogeologic conditions. We recommend that the next draft of the Plan prioritize these potential future strategies in terms of their potential effectiveness. We further recommend that the FCGMA develop procedure to apply a cost/benefit analysis to determine which of the prioritized strategies should be implemented.

4. As a general matter, we also encourage the FCGMA to consider more dynamic use of aquifers with dewatered storage space as a potential resource for future conjunctive use programs. Other basins, such as the Chino and Orange County basins, are currently planning and using available dewatered storage space for local and regional conjunctive use programs that yield better water supply reliability and financial benefits to support other necessary basin management programs. The FCGMA could pursue similar programs. There are numerous hydrogeologic and policy matters that must be resolved to implement a large scale groundwater storage program. Still, we recommend that the Plan include additional and more detailed discussion of potential opportunities for active conjunctive use programs within the FCGMA area.

We look forward to viewing the model results and the next iteration of the draft Plan so that we may provide more specific comments. As we noted in our prior letter, we appreciate the open and interactive environment in which this planning effort is being conducted. Thank you for your consideration of these additional interim comments.

Sincerely,

Anthony A. Emmert
Water Resources Manager

cc: Board of Directors, Fox Canyon Groundwater Management Agency
Jeff Pratt
Gerhardt Hubner
David Panaro
M & I Providers Group

L:\My Documents\Wtr Agncs\FCGMA\Ltr_FCGMA_Bachman_Re_Drft_Grndwtr_Mgmnt_Pln_Comments_20060816.doc

ARNOLD, BLEUEL,
LAROCHELLE, MATHEWS &
ZIRBEL, LLP
ATTORNEYS AT LAW

ATTORNEYS

GARY D. ARNOLD
BARTLEY S. BLEUEL
DENNIS LAROCHELLE
JOHN M. MATHEWS
MARK A. ZIRBEL
DENNIS P. McNULTY
KENDALL A. VAN CONAS
AMBER A. EISENBREY
PETER D. LEMMON

OF COUNSEL
SUSAN L. McCARTHY

300 ESPLANADE DRIVE, SUITE 2100
OXNARD, CALIFORNIA 93036
TELEPHONE: 805.988.9886
FAX: 805.988.1937
www.atozlaw.com

WRITER'S E-MAIL
jmathews@atozlaw.com

August 16, 2006

Received AUG 2006 Fox Canyon GMA

Mr. David Panaro
Fox Canyon Groundwater
Management Agency
800 S. Victoria Avenue
Ventura, CA 93009

Re: Draft Goundwater Management Plan

Dear David:

Pleasant Valley County Water District ("PVCWD") has reviewed the Fox Canyon Groundwater Management Agency (GMA) Draft Groundwater Management Plan. The staff of the GMA and their consultants are to be congratulated on their efforts in drafting this comprehensive document. We continue to believe that the best way to address our groundwater issues in Ventura County is the consensus building approach that the GMA has always embraced. In our review we have several initial comments. Our comments are made sequentially based upon the GMA draft.

1. On page 23, under the section "*Groundwater Extractions*", in the third paragraph it refers to increased agricultural efficiencies. We believe that somewhere in this paragraph reference should be made to the fact that extractions from the groundwater may have also decreased because increased yields from the Freeman diversion and the Conejo Creek project.

2. On page 43, in the section entitled "*Assessment of Basin Management Objectives*", in the second paragraph it refers to BMOs for groundwater levels in the Pleasant Valley basin. In table 3, it makes reference to Basin Management Objectives in the Pleasant Valley area. but does not set forth what the current levels are, it would be helpful to state the groundwater BMOs.

3. On page 48, under the section "*Contingency Plan for LAS Seawater Intrusion*", it states that the GMA staff has developed a contingency plan to address the intrusion of seawater into the LAS. It would be helpful if drafts of that Contingency Plan could be made available for public review.

Mr. David Panaro
Fox Canyon Groundwater
Management Agency
Re: Draft Goundwater Management Plan
August 16, 2006
Page 2

4. On page 50, under the section "*Conejo Creek Diversion Project*", the last sentence references that over the "net 20 years" that the yield of the diversion might decrease. There obviously is a spelling error there in that the word "net" should be "next". Furthermore, input should be sought from Camrosa Water District to determine whether or not their proposed plans will in fact reduce yield to Pleasant Valley. In discussions with Richard Hajas, it is our understanding that Camrosa's intent is to continue to provide current levels of diverted water to Pleasant Valley and in fact yields may be increased.

5. On page 55, under the section "*Great Project (Recycled Water)*", the first paragraph makes reference to the delivery of recycled water to the Pleasant Valley area. Pleasant Valley has continued to express their concerns to the City of Oxnard about the suitability of the recycled water for agricultural use. In particular, Pleasant Valley is concerned about the "stigma" that recycled water has in the market place. Many growers are now required to provide information on the source of their irrigation water. In the event that recycled water is used, the agricultural produce is often downgraded.

   Also, Pleasant Valley has concern about the injection of recycled water into the LAS. Injection into the LAS is discussed on pages 65 and 66. Because the LAS is the only groundwater source for the Pleasant Valley County Water District, Pleasant Valley will closely scrutinize any injection of recycled water into the LAS.

   We feel that a better alternative to injection would be the transportation of the recycled water to the spreading grounds. This would enhance recharge and remove concerns relative to injection.

6. On page 59, under the section "*Non-Export of FCGMA Water*", the last paragraph on that page states "It appears that current ordinances and policies of the FCGMA are sufficient to deal with its export issue." In light of recent issues, the ordinances of the GMA should be reviewed again to make sure that they are adequate to address the export issues. In particular, the enforcement provisions relating to export of "GMA" water should be closely reviewed.

7. On page 63, under the section "*Increase Diversions from Santa Clara River, Potential Effectiveness*", the first sentence states "The Santa Clara River remains a primary recharge source for the Oxnard Plain and Pleasant Valley basins." Based upon our understandings of various studies, it is a little misleading to suggest that the Pleasant Valley basin gets much recharge from the Santa Clara River. Although there may be some recharge, even that is disputed, it is clear that the amount of recharge is minimal at best.

Mr. David Panaro
Fox Canyon Groundwater
Management Agency
Re: Draft Goundwater Management Plan
August 16, 2006
Page 3

8. Beginning on page 71, under the section "*Shelf Life for Conservation Credits*", it is Pleasant Valley's opinion that at the present time there is no need for "sunsetting" of conservation credits. While conservation credits have been built up by not only Pleasant Valley, but other entities, it was the very purpose of allowing for conservation credits so that the credits could be retained and used for future needs. Pleasant Valley sees no present need to "sunset" the conservation credits. Credits would only be used when there was inadequate surface water from the Freeman Diversion and the Conejo Creek Project, and pumping from our wells were insufficient to meet our needs. Putting a shelf life on credits seems to suggest that Pleasant Valley would utilize their credits to over pump and waste water.

It is also our opinion that putting a shelf life on credits, will also remove incentives to look for creative water solutions. For example, much of the impetuous for Pleasant Valley to participate in the Conejo Creek Project, was the fact that credits would be generated.

We appreciate the opportunity to provide our comments concerning the draft, and look forward to the further development of the plan.

Very truly yours,

ARNOLD, BLEUEL, LAROCHELLE,
MATHEWS & ZIRBEL, LLP

John M. Mathews

JMM/ksvk
cc: PVCWD
S:\USER\SHARE\P\PVCWD\Correspondence\Panero 8-16-06.wpd

August 17, 2006

AUG 2006
Received
Fox Canyon
GMA

Fox Canyon Ground Water Management Agency
Ventura County Government Center Administration Building
800 South Victoria Avenue
Ventura, California 93009-1600

Attention: Mr. Lynn E. Maulhardt, Chair

Subject: Comments on the Public Review Draft Updated Management Plan dated June, 2006

Dear Mr. Maulhardt:

Saticoy Country Club (SCC) has a vested interest in the proposed changes to the current Fox Canyon Groundwater Management Agency Management Plan (Management Plan Update) but we have not been able to complete our comments in time for the August 21, 2006 deadline for comments. While this letter presents our early thoughts on several issues in the draft Management Plan Update, we intend to continue our effort to prepare comments. Our goal is to have our completed comments shortly after the next FCGMA Groundwater Management Plan Workshop on August 31, 2006. With this schedule we trust our comments will be considered for incorporation in the Final Management Plan Update.

SCC has significantly reduced our water usage through a reduction in irrigated acreage and increased our efficiencies through infrastructure improvements and our water management practices including the following:

- Hired a golf architect to provide a plan to reduce our irrigated acreage from about 117 acres to 95 acres.
- Implemented the 95 acre plan.
- Hired a landscape architect to prepare a drought resistant landscape plan.
- We are in the process implementing the landscape plan.
- Converted many sprinkler heads to more efficient one half head models along the edges of the fairways.
- Rewired each of our sprinkler heads and installed new sprinkler controls for improved individual run time controls.
- We have on-going turf grass studies for additional efficiency improvement.
- A complete irrigation system upgrade evaluation is planned within the next few years.

For the draft Management Plan Update we have identified two areas so far that warrant comments. Those are:

Continuation Of 25% Pumping Reduction

SCC supports all efforts to bring the basins into safe yield and we not only have committed to reduce our overall pumping but we also have committed significant capital resources to increase our efficiencies. As briefly described above we have made a significant efficiency effort already through our infrastructure alterations and water management practices and will continue that effort in the future. As such it is our opinion that to continue the phased reductions to the full 25% reduction (with possible further reductions) only to M&I users is unfair and that the Draft Management Plan Update should either include provisions to reward increases in efficiencies by M&I users and/or to implement additional productive measures to also reduce agricultural pumping.

SATICOY COUNTRY CLUB

4450 NORTH CLUBHOUSE DRIVE
SOMIS, CALIFORNIA 93066
(805) 485-4956
FAX (805) 647-1158

Agricultural users consume far more of the resource and it is completely unfair to place the burden of balancing the basin on the M&I users.

Shelf Life For Conservation Credits

We understand the potential concerns of accumulating Conservation Credits with no expiration date and that this accumulation effectively has left a large theoretical pumping debt on the aquifers. Sunset provisions may be warranted in many cases. Our initial concerns with this proposed provision alteration is how it may impact different size users and also the potential for removal of credits earned through our continued efficiency improvements.

We look forward to discussions on both of these issues in the workshops.

Sincerely,

John R. Powell. RG, CEG
For the Water Committee

City of Camarillo

601 Carmen Drive • P.O. Box 248 • Camarillo, CA 93011-024

Public Works
(805) 388-5380

August 25, 2006

Mr. Jeff Pratt, P.E.
Executive Officer
Fox Canyon Groundwater Management Agency
800 South Victoria Avenue
Ventura, CA 93009

Subject: Comments to Fox Canyon Groundwater Management Agency Draft Groundwater Management Plan (June 2006)

Dear Jeff,

The City of Camarillo, and its consultants, Black & Veatch and Hopkins Groundwater Consultants, Inc., have reviewed the June 2006 Draft Groundwater Management Plan (Draft GMP) prepared by your agency, and attended two Agency workshops. Based on these interactions, we offer the following comments and recommended actions.

Comments Regarding Development of Brackish Groundwater

The Draft GMP provides discussion in several locations regarding the potential feasibility of the development of the brackish groundwater supply in the northern portion of the Pleasant Valley Basin. The following comments are in regards to this subject.

1. Comment: Page 58 indicates the following, "*the City of Camarillo is considering a strategy to move some of its current pumping from the area of the LAS pumping depression beneath Pleasant Valley to this area of poorer-quality rising groundwater. Under this plan, the poorer-quality water would be extracted and desalted in a similar manner to the South Las Posas Basin project approved by the FCGMA.*"

   Recommended Action: Consider replacing this text with the following, "*The City of Camarillo has assessed the feasibility of constructing a Groundwater Treatment Facility that* *would be located in the Somis Gap area of the Pleasant Valley Basin (Black & Veatch, August 2005). The study determined the project to be technically feasible and would allow Camarillo to halt pumping from an area of the LAS with depressed groundwater levels and instead pump in an area of rising groundwater levels. This plan is similar in nature to the South Las Posas Basin project, which was previously approved by the FCGMA Board and consistent with policy to move pumping to areas of known substantial recharge (i.e., Oxnard Forebay) which will create more storage space for future recharge events. The City of Camarillo proposes to coordinate pumping strategies between various stakeholders in the neighboring sub-basins in order maintain replenishment of the Pleasant Valley Basin."*

2. Comment: The majority of the discussion on page 58 focuses on the development of brackish groundwater in the LAS of the Pleasant Valley Basin by means of Camarillo's Groundwater Treatment Facility project. However, the third paragraph awkwardly mixes in a brief discussion of an alternate subject in an area of the Pleasant Valley Basin that is far away from the observed recharge in the forebay.

   Recommended Action: Please elaborate on the significance of this paragraph to Camarillo's Groundwater Treatment Facility Project or relocate this paragraph to an alternate location to maintain the continuity of the discussion regarding Camarillo's Groundwater Treatment Facility project which is in the forebay.

3. Comment: Page 17 provides the following description of the Pleasant Valley Basin, *"Despite the fault barrier to the west, the LAS is in hydrologic continuity with the adjacent southern portion of the Oxnard Plain Basin, which is the primary recharge source for the Pleasant Valley Basin."*

   Two paragraphs later, the following is stated, *"At the northeast edge of the Pleasant Valley basin, where Arroyo Las Posas flows cross the basin boundary, increased flows in the arroyo have apparently percolated directly into the LAS, significantly raising groundwater levels in City of Camarillo wells. This recharge suggests that this portion of the Pleasant Valley Basin is unconfined, contrary to current understanding of the basin."*

   Recommended Action: Consider the following definition of the Pleasant Valley Basin and explanation of recharge sources for this basin:

   "Historically it was assumed that the LAS of the Pleasant Valley Basin was relatively confined and received little overall recharge. This assumption was based on the understanding that the primary recharge source for this basin was from the adjacent Oxnard Plain Basin to the south and recharge potential between these basins was low due to the low permeability of the Pleasant Valley Basin aquifer in this region, as well as the presence of a fault barrier in the lower portions of the Oxnard Plain. However, since the early 1990's, water levels have begun to rise in the northern adjacent basins. The City of Camarillo has two existing wells in the northeast portion of the Pleasant Valley Basin (hereafter called the Somis Area) and these wells confirm that rising water levels in northern adjacent basins directly impact recharge rates, water quality, and water levels in the Somis Area.

The recharge in the Somis Area (Pleasant Valley Forebay) may be a result of the Saugus Formation being folded upward and subsequently eroding away in the Somis gap area covering the underlying bedrock with a predominantly sandy alluvial layer that allows rapid stream flow percolation. If this theory is correct, it is also likely true that the primary source of recharge for the Pleasant Valley Basin prior to the decline of the water levels in the adjacent northern basins was a forebay in the Pleasant Valley Basin and this primary recharge source is again prevalent due to the recent rise in water levels in the northern basins. It is recommended that additional monitoring and studies be conducted to determine if this theory is correct."

Figure 1 illustrates the conceptual location of the Pleasant Valley Forebay.

4. Comment: Page 58 indicates the following, *"Base flow from the Arroyo Las Posas has migrated completely across the South and East Las Posas Basins and into the northernmost Pleasant Valley Basin, providing a source of new recharge to this portion of the Pleasant Valley Basin. Coordination in pumping strategies between the sub-basins is recommended in order to avoid negatively impacting groundwater levels in the Fox Canyon Groundwater Basin."* As stated in Comment #3, this may not be a "new" source of recharge but instead reestablishing of an old source of recharge to the Pleasant Valley Basin.

   Recommended Action: Consider revising the text to indicate that the Somis Gap was potentially the primary recharge source for the Pleasant Valley Basin prior to pumping activities in the northern adjacent basins.

5. Comment: The Draft GMP does not segregate the Pleasant Valley Basin into sub-basins, it only describes the basin as a whole. Furthermore, the last sentence of the second paragraph of page 17 indicates a lack of current understanding of this basin.

   Recommended Action: Please elaborate on the current understanding of the Pleasant Valley Basin and clarify how the basin is currently handled in the model. It is also recommended that the authors consider sub-dividing the Pleasant Valley Basin into sub-basins (Pleasant Valley Forebay and Pleasant Valley Basin) to assist in evaluating the different potential recharge sources for the basin.

6. Comment: The second paragraph on page 33 indicates groundwater levels in the LAS have consistently been below sea level in the Pleasant Valley Basin. This is not true across the entire basin.

   Recommended Action: Clarify that water levels in the southern portion of Pleasant Valley Basin have historically been below sea level since the 1950's. However, water levels in the northeastern portion of the basin near the Somis gap have historically been above sea level and continue to rise along with levels in the adjacent northern basins.

7. Comment: The last sentence of the second paragraph on page 29 states that: *"It is too early to know whether chlorides in the Pleasant Valley Basin will escalate to a problem affecting local pumpers."* This sentence is restated in the third sentence of the second paragraph on page 35. In both places it should be noted that two City of Camarillo wells (Wells A and B) have already been impacted by a rise in chlorides, which has prompted the City to discontinue use of Well A and to blend water from Well B with higher quality imported water to meet drinking water standards.

   Recommended Action: Revise the referenced sentences to indicate that chloride levels in the southern portion of the basin have risen marginally from rising water levels, but due to limited data, the marginal rise of chloride levels could be much higher. However, as shown on Figure 14 of the draft GMP, sulfate and TDS levels in the northern portion of the Pleasant Valley Basin have been rising steadily and have already exceeded secondary drinking water standards. Available data also indicate that concentrations of iron and manganese are also rising in response to basin recharge and have risen to levels that impair M&I uses.

8. Comment: Page 35 provides discussion on increasing sulfate and chloride levels in the northern Pleasant Valley Basin and indicates water treatment will be needed for potable or irrigation use.

   Recommended Action: Consider expanding the discussion to include the following text: *"Camarillo has evaluated the feasibility of constructing a Groundwater Treatment Facility that would intercept a portion of the poorer water quality surge and remove salts from the aquifer system. This would help protect the water quality in the southern portion of the basin and preserve higher quality water for use by other pumpers in areas of major overdraft. Furthermore, by utilizing the water from the Groundwater Treatment Facility, Camarillo could curtail or eliminate pumping operations in the southern portion of the Pleasant Valley Basin, which would promote recovery of the depressed water table in that region. Further details of the project are provided in the section titled, Development of Brackish Groundwater, Pleasant Valley Basin."*

9. Comment: The second sentence of the last paragraph on page 43 indicates, *"Basin Management Objectives (BMOs) for chloride concentrations in the Pleasant Valley Basin are currently being met, although chlorides are rising slowly in a few wells in the basin."*

   There are a number of wells that indicate that the BMOs are not being met. For example, County data indicate that 1N/21W-1B04 screened 820 to 1150 feet has chloride greater than 200 mg/l, 1N/21W-3C01 screened 956 to 1216 feet has chloride greater than 260 mg/l, and 1N/21W-1D02 screened 107 to 437 feet has chloride greater than 450 mg/l.

   Recommended Action: Consider revising the statement to indicate that BMOs are not currently being met throughout the entire Pleasant Valley Basin.

10. Comment: The first sentence of the last paragraph on page 58 indicates, *"Under current FCGMA policy, City of Camarillo pumping of poor-quality groundwater along Calleguas*

Creek would have to be pumped using existing allocations if the well was within the FCGMA boundary." The City of Camarillo understands that current FCGMA policy has evolved over time and has previously allowed unrestricted pumping of poorer quality shallow groundwater, with the semi-perched zone in the Oxnard Plain and the South Las Posas along the Arroyo being two examples.

Recommended Action: Consider revising the last paragraph of page 58 to say: *"Previously, City of Camarillo pumping of poor-quality groundwater along Calleguas Creek would have to be pumped using existing allocations since the wells are within the FCGMA boundary. However, as FCGMA policy has evolved over time, unrestricted pumping of poorer quality shallow groundwater has been allowed. For the Camarillo Project, a coordinated effort between the FCGMA and City of Camarillo should be undertaken to define the potential benefits of operating the City of Camarillo Groundwater Treatment Facility. Extractions of poor-quality water without allocations are discussed in more detail in the section titled "Recommended Additions to FCGMA Policies."*

Comments Regarding Further Pumping Reduction Strategies

The Draft GMP includes discussions on the continuation of 25 percent pumping reductions. The M&I users are impacted by reduction strategies while agricultural users are impacted by irrigation efficiency strategies. The actual benefit of the 25 percent pumping reduction is limited because the M&I component of groundwater use (about 30 percent) is significantly less than agricultural uses (about 70 percent) as illustrated in Figures 4 and 5 of the GMP. As a result, this strategy will only ensure a minor reduction in the overall pumping, which will be from the M&I users. This conserved amount could easily be negated by inefficient agricultural practices. Therefore, it is recommended that the 25 percent (or greater) reduction strategies should be reviewed in conjunction with agricultural efficiency calculations. In addition, FCGMA should consider more restrictive crop efficiencies and consider a replenishment fee to be paid by all users.

Specific comments related to pumping reduction strategies are:

11. Comment: The last 3 paragraphs on page 23 discuss groundwater extraction reduction. The numbers presented in the second paragraph in this section indicates that the total reduction in pumping is about 22 to 23 percent. The next paragraph indicates that the largest decrease in pumping is from agricultural uses, while the last paragraph indicates that the first phase of the FCGMA enforced pumping reductions of 15 percent resulted in the reduction of 8,300 acre-feet of pumping by the M&I users. However, the discussion on the reduced pumping does not appear to reflect the transfer of allocation from agricultural uses to M&I service, or the fact that while some M&I providers are using all their allocation, others have been conserving them for conjunctive use with other sources. We believe that the apparent 15 percent reduction in pumping is somewhat coincidental and that the overall M&I allocation for groundwater use has increased substantially due to land use conversion.

Recommended Action: This discussion should compare the changes in acreage irrigated and

M&I acreage served over the same time period that pumping reduction has occurred. This may also be the place to discuss the likelihood that under recording meters, or agricultural wells with no meters at all, may be contributing to the apparent reduction in reported agricultural pumping.

12. Comment: The second paragraph of page 52 implies that there is a universal acceptance of the pumping reductions and the stiff penalty for over pumping. The City of Camarillo doesn't agree that there is a universal acceptance of the pumping reductions. It is the City's view, as well as other M&I users, that the reduction is not equitable and recommends that the efficiency policy be reviewed in conjunction with production meter testing activities.

    Recommended Action: Consider revising the text to indicate there may be general acceptance of the pumping reduction policies but not universal agreement. The reduction policies should consider equal distribution in sharing the burden in resolving water level deficits in the basins..

General Comments on the Draft GMP

The following comments and recommendations are more general in nature:

13. The third paragraph on page 59 states that the baseline allocation is two acre-feet per acre. The City of Camarillo understands that the two acre-feet per acre may have been the historical allocation, not the baseline allocation. Baseline allocation is only one acre-foot of water per acre, and should be considered when analyzing the baseline allocation policies.

14. Page 63 provides a discussion on the potential effectiveness of importing additional state water. Further clarification of this paragraph would be very helpful in understanding this potential strategy.

15. Page 73 provides a discussion on penalties used to purchase replacement water. It should be noted that a large percentage of overpumping is by agricultural users who have the ability to escape penalties by switching to irrigation efficiency and consequently the revenue from these fees has historically been very little. Therefore, using this revenue to purchase replenishment water may be of little benefit to the basins.

16. Page 79 includes a section on *"Extractions of Poor-Quality Water Without An Allocation"*, which would be an addition to current FCGMA policy. The City of Camarillo supports such a strategy that allows projects that would benefit the overall aquifer system. The City of Camarillo would like to see this policy implemented and would appreciate the opportunity to review and comment on the draft policy.

17. FCGMA has reduced pumping and approved projects that provide some benefit to some portion of aquifers within the agency boundaries. However, this does not promote the implementation of projects in critical areas of the basin that are just outside of agency boundaries.

Before implementing the next stage of pumping reductions on M&I users, the City of Camarillo recommends that the FCGMA evaluate larger picture projects that could help solve groundwater impacts in the most critical areas and potentially provide solutions in-lieu of additional pumping reductions.

Further pumping reductions could possibly be avoided if the current basin by basin management approach was revised and strategies were implemented based on the principal that downstream basins are impacted by upstream uses and that the impact is therefore created by both agricultural and M&I users who pump from all basins.

FCGMA could consider implementing a "mitigation fee" of approximately $10/AF that would be paid by all groundwater users in the FCGMA. This strategy would allow funding for agencies like UWCD, Oxnard, or Calleguas MWD to develop projects that would effectively improve the conditions of the basins as a whole by moving water to over pumped areas within FCGMA boundaries. This approach would help prevent basin by basin management which could inordinately impact users in downstream basins, like the City of Camarillo.

18. The City of Camarillo is under the impression that there is a quantifiable amount of groundwater being exported outside the FCGMA boundary from Pleasant Valley and Las Posas Basins. The City of Camarillo would recommend that FCGMA pursue controlling the exportation of groundwater before additional pumping reductions are approved.

19. The Draft GMP indicates that FCGMA is considering expiring accumulated groundwater credits. It should be noted that M&I users conjunctively balance surface water and imported supplies with local groundwater thereby conserving groundwater for use when surface and imported supply is not available. Therefore, setting a time limit on credits works against this water supply management philosophy.

    Credit reduction is an issue that should be reviewed separately for M&I uses and agricultural uses. Similar to implementing 25 percent pumping reductions, credit reductions would only impact M&I agencies who conduct long-term planning, since agricultural users could go on efficiency allocation and would not be impacted by a loss of credits. M&I users do not have this option.

    In regards to agricultural credits, please note that UWCD surface water deliveries have in part allowed accumulation of credits by agricultural users that receive surface water for irrigation. Those who funded the Freeman Diversion have in part funded the accumulation of these credits when surface deliveries were annually increased.

    The credit reduction strategy is believed to be of very little benefit to the overall basins but would have a significant impact to M&I users. If there is a desire to eliminate the perceived "groundwater debt", agricultural credit reduction should be the first consideration.

Pages 71 and 72 state that there are tens of thousands of acre-feet of accrued conservation credits. The credits that the City of Camarillo has accrued came at a high cost, when we purchase more expensive imported water. Poor quality groundwater has forced the City of Camarillo to blend groundwater with imported supplies, subsequently accruing groundwater credits. The City of Camarillo intends to retain its credits until such time they are needed to meet demands during a drought. Even though credits cannot be sold, they have a value to M&I users that is equal to the over pumping surcharge.

FCGMA should reconsider the proposed strategy of expiring/reducing M&I groundwater credits .

20. Page 73 discusses proper filling and capping of abandoned or leaking wells and states that FCGMA helps with the costs associated with well abandonment. The owner of the land that the well is on should be responsible for costs associated with destruction of well(s).

21. Page 75 provides a discussion of additional reductions in pumping allocations. It is recommended that further reductions not be implemented until after the meter testing effort is complete. Perhaps FCGMA should require an initial testing of all meters within one year. This would be very beneficial to the modeling effort because the model will only be as accurate as the information used to develop it.

The City of Camarillo requests the opportunity to provide additional comments once the groundwater modeling effort for the GMP is available for review. The City believes it would be valuable if the GMP provided more quantifiable measures regarding water level deficits and anticipated impacts each FCGMA strategy would contribute towards reducing those deficits. However, the City recognizes that those quantifiable measures would much easier to identify once the modeling results are available.

Please contact me at (805) 388-5334 if you have any questions or need additional information.

Very truly yours,

City of Camarillo

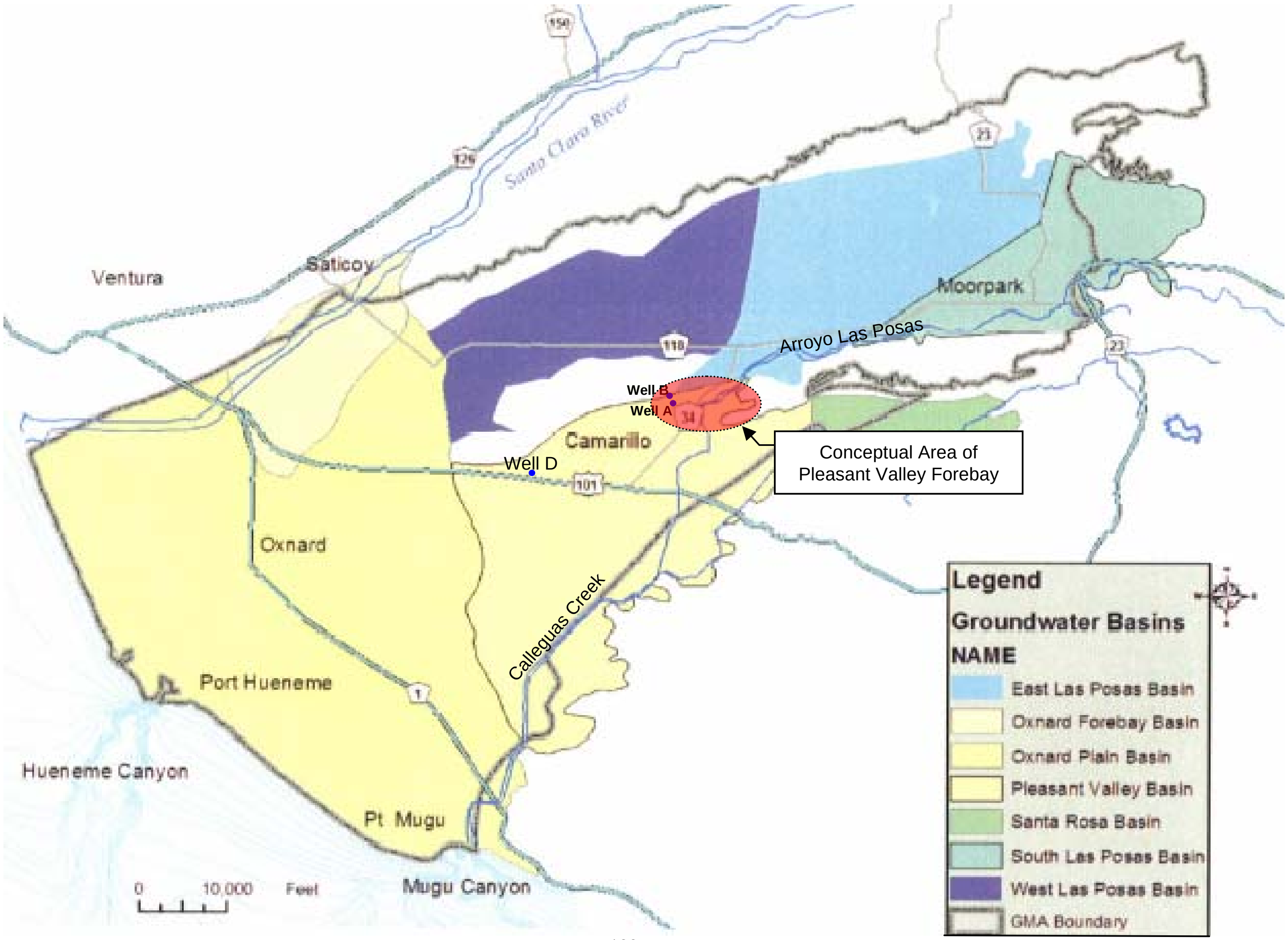
Lucia McGovern
Deputy Director of Public Works

Attachment – Figure of Pleasant Valley Forebay

cc:
Tom Smith – City of Camarillo
Curtis Hopkins – Hopkins Consultants
Randy Krueger – Black & Veatch
Tony Emmert – City of Oxnard
Jim Kentosh – UCWD
Jim Passanisi – City of Ventura
Carrie Mattingly – City of Port Hueneme
Steve Bachman, PhD – UCWD
Don Kendall, PhD – Calleguas MWD

Figure 1

Pleasant Valley Forebay Map



Lawrence (Larry) Fuller
7935 Dusty Lane
Somis, CA 93066
805-386 -4086

September 26, 2006

SEP 2006
Received
Fox Canyon
GMA

Fox Canyon Groundwater Management Agency
800 S. Victoria Ave.
Ventura, CA 93009

Attn: David Panaro, Jeff Pratt & Steve Bachman

Subj: Comments and concerns on the FCGWMA Management Plan.

Hi David,

I told you that I would put in writing some of my thoughts and concerns expressed in the 1st workshop. My research has led me to look at the management plan in the light of the State of California water case law especially the case CITY OF BARSTOW et al., v. MOJAVE WATER AGENCY (S071728) 21 August 2000. This case clarifies the Supreme Court of California's position on water rights. A summery of the Courts decisions can be found in Downey Brand Attorneys LLP document titled California Water Law & Policy Reporter- October 2000.

It is my understanding that the FCGWMA used the "equitable" (physical) concept for allocating pumping to all of the Fox Canyon aquifer pumpers. This method of allocation is clearly a violation of the law, if I understand the California Supreme Court ruling cited above. The three levels of priority, as stated in the case law, are 1st Priority Overlying Owners, 2nd in priority are appropriators and 3rd are exporters (water transferred out of the immediate pumping area).

The clearest statement of this fact is found on page 29 starting with line 3. "We repeat the guiding principle: 'Under California law, "[p]roper **overlying use**, ...is paramount, and the right of an **appropriator**, being limited to the amount of **surplus**, must yield to that of the overlying owner in the event of a shortage unless the appropriator has gained prescriptive rights through the taking of nonsurplus waters." [Citation.]' (*Hi-Desert County Water Dist. V. Blue Skies Country Club, Inc., supra*, 23 Cal.App.4th 1723-1731, Thus, while the rights of all overlying owners in a ground water basin are correlative, and subject to cutbacks when the basin is over drafted, **overlying rights are superior to appropriative rights.** Here, the trial court did not attempt to determine the priority of water rights, and merely allocated pumping rights based on prior production. This approach elevates the rights of appropriators and those producing without any claim of right to the same status as the rights of riparins and overlying owners. The trial court erred in doing so."

It is my request that the FCGWMA board of directors DO NOT make any further pumping reductions until these legal issues can be resolved. The case law sited states that only the Court has the right to restrict our pumping. A little caution now could prevent law suits caused by not following the law. (page 54,61) The original allocation system did not take into consideration efficient use of water and therefore it was/is flawed. **The allocation should also consider the number of water sources available to a given property.** Some properties have water available via pipelines from major water suppliers while many properties are dependent on their wells as the only source of water. Small users, Coops and small M &I/Agriculture systems are not addressed specifically in Management Plan. In addition to this the FCGWMA board has no small operation representative on the board to insure that their interests and concerns will be heard.

Another issue that I talked about in the workshop was the FCGWMA's Board approval of CMWD application for injection/storage facilities in North Las Posas Groundwater Basin.

According to my understanding this letter opens the door for CMWD to acquire Fox Canyon Aquifer **prescriptive** pumping rights. The Board has already allowed the injection wells to be drilled and injection of imported water is progressing. It is imperative that CMWD be restricted **IN WRITING** that they will not be allowed to extract water outside of their injection field. The Board can not by letter change the California water laws regarding prescriptive water rights that can and will be developed if pumping is allowed outside of the injection site boundaries. See page two paragraph 4. end of 1st sentence....**OR IN THE NEAR VICINITY**. What constitutes "near"? One mile, five miles? It is a known fact that CMWD wants to pump Fox Canyon water to blend with their imported water. Overlying owner priority rights will be affected if this issue is not addressed before any extraction is started out side their injection field.

Another problem area with CMWD that was discussed, concerned the One for One or gallon for gallon of water pumped to be extracted. When I addressed this issue your engineer made light of my comments concerning both the wetting factor of the dry sands and the drift factor of the water moving through the aquifer. I have friends that are very knowledgeable in the field of both hydrology and geology. They state that anyone who knows anything about the Fox Canyon aquifer knows about the drift out through Hueneme Canyon and the losses of fluid due to wetting of a dry formation. I can only assume that CMWD is injecting into an area that is dry—water does not compress. David this is right down your alley. I know with your training you can do the calculations for both the wetting and the transfer function even if your engineer can't. The FCGWMA should not be providing free water to CMWD.

The Court case sited discussed in detail the effect of allowing a right by prescription to be developed. Please look into all of the FCGWM ordinances in the light of the rulings by the Court.

Sincerely,

Larry Fuller

Larry Fuller

Encl: Copies for Mr. Jeff Pratt
Mr. Steve Bachman

Pleasant Valley Groundwater Basin

- Groundwater Basin Number: 4-06
- County: Ventura
- Surface Area: 21,600 acres (33.7 square miles)

Basin Boundaries and Hydrology

This basin underlies Pleasant Valley in southern Ventura County. The basin is bounded on the north by the Camarillo and Las Posas Hills and on the south by the Santa Monica Mountains (CSWRB 1956). The eastern boundary is formed by a constriction in Arroyo Santa Rosa (CSWRB 1956). The basin is bounded on the west by the Oxnard subbasin of the Santa Clara River Groundwater Basin (CSWRB 1956). Ground surface elevations range from about 15 feet in the west to about 240 feet above sea level in the east (CSWRB 1956). Calleguas Creek and other tributary creeks drain the surface waters of the area westward toward the Pacific Ocean (CSWRB 1956). Average annual precipitation ranges from 12 to 16 inches.

Hydrogeologic Information

The primary water-bearing materials are alluvial sands and gravels of upper Pleistocene to Holocene age and the lower Pleistocene San Pedro Formation (CSWRB 1956). Permeable deposits within the upper Santa Barbara Formation underlie the San Pedro Formation and contain fresh groundwater of minor importance (CSWRB 1956). Average specific yield is about 10.5 percent.

Water Bearing Formations

Alluvium. The Pleistocene to Holocene age alluvium consists of silts and clays with lenses of more permeable sand and gravel. Groundwater is unconfined in this unit, but little is extracted.

San Pedro Formation. The Pleistocene age San Pedro Formation consists of an upper unit of fine silt and clay that forms an impermeable layer over an extensive 100 to 300 foot thick gravel unit in the lower San Pedro Formation called the Fox Canyon Aquifer (CSWRB 1956). The average specific yield of the gravels is about 10.5 percent for the confined basin and well yields average about 1,000 gal/min (Panaro 2000a).

Restrictive Structures

Faults and folds trend dominantly east-west through this basin. A change in sedimentary character of the upper alluvium system occurs across the Camarillo fault, with the alluvium on the north side of the fault containing a much higher percentage of sand and gravel. The Springville fault zone displaces and folds the Fox Canyon gravels along the northern boundary of the basin. Folds roughly parallel to the Springville fault zone and the Camarillo fault disturb the Fox Canyon gravels and cause them to crop out in the Camarillo Hills along the north side of the basin (CSWRB 1956).

Recharge Areas

Recharge to the basin comes dominantly from subsurface flow across the Springville fault zone, through Fox Canyon gravels from the Arroyo Santa Rosa Valley Basin, and through fractures in the volcanic rocks that comprise the Santa Monica Mountains to the south. A modest amount of irrigation water and septic system effluent also contribute to basin recharge.

Groundwater Levels Trends

During 1980 through 1999, groundwater levels fluctuated over a range of about 130 feet. Hydrographs show an annual cyclic rise and fall of water level of up to 70 feet with longer-term variations apparently following precipitation cycles. The basin was at a low level in 1991 and 1992, then recovered to moderate levels and has remained stable in the upper range of water level since then. In October 1999, the basin was estimated nearly 60 percent full (Panaro 2000a).

Groundwater Storage

Groundwater Storage Capacity. Total storage capacity is calculated at 1,886,000 af (DWR 1975; Panaro 2000a).

Groundwater in Storage. The basin was estimated to be 60 percent full in 1999 (Panaro 2000a) implying about 1,130,000 af of groundwater in storage.

Groundwater Budget (Type A)

For 1999, Panaro (2000b) estimated the applied water recharge to be 8,100 af/yr for irrigation return, approximately 18 af/yr for septic systems, and 3,300 af/yr from subsurface inflow. Average annual total extraction is estimated at 18,500 af (Panaro 2000a).

Groundwater Quality

Characterization. Groundwater has calcium as the major cation in solution and chloride, sulfate, and bicarbonate as the major anions (Panaro 2000a). Average TDS content is 1,110 mg/L with a maximum of 3,490 mg/L (Ventura County 2001). Water samples from for 10 public supply wells show TDS concentration ranging from 597 to 1,420 mg/L, with an average of 922 mg/L.

Impairments.

Water Quality in Public Supply Wells

Constituent Group[1]	Number of wells sampled[2]	Number of wells with a concentration above an MCL[3]
Inorganics – Primary	10	0
Radiological	10	1
Nitrates	10	0
Pesticides	10	0
VOCs and SVOCs	10	0
Inorganics – Secondary	10	10

[1] A description of each member in the constituent groups and a generalized discussion of the relevance of these groups are included in *California's Groundwater – Bulletin 118* by DWR (2003).
[2] Represents distinct number of wells sampled as required under DHS Title 22 program from 1994 through 2000.
[3] Each well reported with a concentration above an MCL was confirmed with a second detection above an MCL. This information is intended as an indicator of the types of activities that cause contamination in a given basin. It represents the water quality at the sample location. It does not indicate the water quality delivered to the consumer. More detailed drinking water quality information can be obtained from the local water purveyor and its annual Consumer Confidence Report.

Well Characteristics

	Well yields (gal/min)	
Municipal/Irrigation	Range:	Average: 1,000 gal/min (Panaro 2000b)
	Total depths (ft)	
Domestic	Range:	Average:
Municipal/Irrigation	Range:	Average:

Active Monitoring Data

Agency	Parameter	Number of wells /measurement frequency
Ventura County	Groundwater levels	9
Department of Health Services and cooperators	Title 22 water quality	12

Basin Management

Groundwater management:	Management of the basin is provided by the Fox Canyon Groundwater Management Agency, under the AB-2995 Groundwater Management Plan. (Panaro 2000b)
Water agencies	
Public	Ventura County, United Water Conservation District (UWCD)
Private	

References Cited

California State Water Resources Board (CSWRB). 1956. *Ventura County Investigation*. Bulletin 12. Two Volumes.

California Department of Water Resources (DWR). 1959. *Water Quality and Water Quality Problems, Ventura County*. Bulletin 75. 195 p.

Panaro, D. 2000a. Fox Canyon Groundwater Management Agency: Written Communication to R.R. Davis (DWR), March 2000.

_____. 2000b. Fox Canyon Groundwater Management Agency: Written Communication to B.C. Moniz (DWR), December 2000.

Ventura County Water Resources Division. 2001. www.ventura.org/vcpwa/wre/wrd

Additional References

California Department of Public Works (CDPW). 1933. *Ventura County Investigation*. Division of Water

Resources. Bulletin 46, 244 p.

Jennings, C.W., and Strand, R.G. 1969. *Geologic Map of California: Los Angeles Sheet*. Olaf P. Jenkins Edition: California Division of Mines and Geology, scale 1:250,000, 1 sheet.

Errata

Updated groundwater management information and added hotlinks to applicable websites. (1/20/06)

Fox Canyon Groundwater Management Agency
Ordinance Code

Adopted July 27, 2005
Amended July 28, 2010

CHAPTER 1.0
Definitions

As used in this code, the following terms shall have the meanings stated below:

1.1. **"Actual Applied Water"** – means the total water applied by the grower to the crop over the course of a calendar year without regard to the water source. Examples of actual applied water include the sum of well water, water delivered from a water supplier, and or from surface water diversions. Total applied water does not include precipitation.

1.2. **"Agency"** means the Fox Canyon Groundwater Management Agency.

1.3. **"Agency Boundary"** shall be as depicted on the map adopted by the Board and recorded as an official record with the County Recorder's Office on January 14, 2002 (Document No. 2002-0009215), and as may be adjusted as provided in the Agency's enabling legislation.

1.4. **"Agricultural Extraction Facility"** means a facility from which the groundwater produced is used on lands in the production of plant crops or livestock for market, and uses incidental thereto.

1.5. **"Annual"** means the calendar year January 1 through December 31.

1.6. **"Aquifer"** means a geologic formation or structure that yields water in sufficient quantities to supply pumping wells or springs. A confined aquifer is an aquifer with an overlying less permeable or impermeable layer.

1.7. **"Board"** means the Board of Directors of the Fox Canyon Groundwater Management Agency.

1.8. **"County"** means the County of Ventura.

1.9. **"Developed Acreage"** means that portion of a parcel within the Agency Boundary that is receiving water for reasonable and beneficial agricultural, domestic or municipal and industrial (M & I) use.

1.10. **"East Las Posas Basin"** That part of the former North Las Posas Basin that is east of the subsurface anomaly described by significant changes in groundwater levels, as described in the Groundwater Management Plan and located for record purposes on maps as provided in Section 1.20.

1.11. **"Excess Extraction"** means those extractions in excess of an operator's extraction allocation or adjusted extraction allocation.

1.12. **“Executive Officer”** means the individual appointed by the Board to administer Agency functions, or his/her designee.

1.13. **“Exempt Well Operators”** means all well operators operating extraction facilities supplying a single family dwelling on one acre or less, with no income producing operations and those operators granted an exemption by the Board.

1.14. **“Expansion Area”** means that portion of land beyond the outer limits of the Agency Boundary in the West, East, and South Las Posas Basins that lies between the Agency Boundary and the crest of the hill or 1.5 miles beyond the Agency Boundary as defined by Map Number Two, entitled Fox Canyon Outcrop, Las Posas Basin, 1995. .

1.15. **“Extraction”** means the act of obtaining groundwater by pumping or other controlled means.

1.16. **“Extraction Allocation”** means the amount of groundwater that may be obtained from an extraction facility during a given calendar year, before a surcharge is imposed.

1.17. **“Extraction Facility”** means any device or method (e.g. water well) for extraction of groundwater within a groundwater basin or aquifer.

1.18. **“Foreign Water”** means water imported to the County through the State Water Project facilities or other newly available water as approved by the Board, such as recycled water that would otherwise be lost to the Ocean.

1.19. **“Groundwater”** means water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water.

1.20. **“Groundwater Basin”** means a geologically and hydrologically defined area containing one or more aquifers, which store and transmit water yielding significant quantities of water to wells. For the purposes of this Ordinance Code, groundwater basins that of which either all or a portion or portions thereof are located within the Agency Boundary include, but are not limited to the Oxnard Plain Forebay Basin, Oxnard Plain Pressure Basin, Pleasant Valley Basin, East Las Posas Basin, West Las Posas Basin, South Las Posas Basin and the Arroyo Santa Rosa Basin, as described in the Groundwater Management Plan. The boundaries of these basins are shown on maps that shall be adopted by a Resolution. Groundwater basin boundaries may be modified by a Resolution.

1.21. **“Groundwater Management Plan”** means the 2007 Update to the Fox Canyon Groundwater Management Plan or Board-adopted updates to this plan.

1.22. **“Historical Extraction”** means the average annual groundwater extraction based on the five (5) calendar years of reported extractions from 1985 through 1989 within the Agency Boundary. This average will be expressed in acre-feet per year. All historical extraction allocations became effective on January 1, 1991.

1.23. **“Inactive Well”** An inactive well is a well that conforms to the County Water Well Ordinance requirements for an active well, but is being held in an idle status in case of future need. Idle status means the well is pumped no more than 8 hours during any 12-month period. Inactive wells are not required to have a flowmeter. Pumping to maintain status as an active well under the County Water Well Ordinance shall not exceed 8 hours in a 12 month period, shall be for beneficial use, and shall be estimated and reported to the Agency. Prior to removing a well from idle status, the operator shall install a flowmeter in accordance with the requirements in Chapter 3 of the Ordinance Code.

1.24. **“Injection/Storage Program”** means any device or method for injection/storage of water into a groundwater basin or aquifer within the Agency Boundary, including a program to supply foreign water in lieu of pumping.

1.25. **“Las Posas Outcrop”** or **“Outcrop”** means the area of Lower Aquifer System surface exposure as defined by Map Number One, Fox Canyon Outcrop, Las Posas Basin, 1982.

1.26. **“May”** as used in this Ordinance Code, permits action but does not require it.

1.27. **“Flowmeter”** means a manufactured instrument for accurately measuring and recording the flow of water in a pipeline.

1.28. **“Municipal and Industrial (M & I) Provider”** means person who provides water for domestic, industrial, commercial, or fire protection purposes within the Agency Boundary.

1.29. **“Municipal and Industrial (M & I) Operator”** An owner or operator that supplied groundwater for M & I use during the historical allocation period and did not supply a significant amount of agricultural irrigation during the historical period.”

1.30. **“Municipal and Industrial (M & I) User”** means a person or other entity that used or uses water for any purpose other than agricultural irrigation.

1.31. **“Municipal and Industrial (M & I) Use”** means any use other than agricultural irrigation.

1.32. **“Non-Operating Flowmeter”** – A non-operating flowmeter includes a flowmeter that is out of calibration by plus or minus 5%, and/or a flowmeter that has not been calibrated within the flowmeter calibration schedule adopted by the Board.

1.33. **“Operator”** means a person who operates a groundwater extraction facility. In the event the Agency is unable to determine who operates a particular extraction facility, then “operator” shall mean the person to whom the extraction facility is assessed by the County Assessor, or, if not separately assessed, the person who owns the land upon which the extraction facility is located.

1.34. **“Ordinance Code”** means the Fox Canyon Groundwater Management Agency Ordinance Code.

1.35. **“Overdraft”** means the condition of a groundwater basin or aquifer where the average annual amount of water extracted exceeds the average annual supply of water to a basin or aquifer.

1.36. **“Owner”** means a person who owns a groundwater extraction facility. Ownership shall be determined by reference to whom the extraction facility is assessed by the County Assessor, or if not separately assessed, the person who owns the land upon which the extraction facility is located.

1.37. **“Perched”** or **“Semi-Perched Aquifer”** means the shallow, unconfined aquifer that overlies the Oxnard Aquifer in Sealing Zone III, as described in the California Department of Water Resources Bulletin No. 74-9.

1.38. **“Person”** includes any state or local governmental agency, private corporation, firm, partnership, individual, group of individuals, or, to the extent authorized by law, any federal agency.

1.39. **“Recharge”** means natural or artificial replenishment of groundwater in storage by percolation or injection of one or more sources of water.

1.40. **“Resolution”** means a formal statement of a decision adopted by the Board.

1.41. **“Safe Yield”** means the condition of groundwater basin when the total average annual groundwater extractions are equal to or less than total average annual groundwater recharge, either naturally or artificially.

1.42. **“Section”** as used in this Ordinance Code, is a numbered paragraph of a chapter.

1.43. **“Semi-Annual Groundwater Extraction Statement”** is a form filed by each operator containing the information required by Section 2.2 and 2.3.1 and shall cover the periods from January 1 to June 30 and from July 1 to December 31 annually.

1.44. **“Shall”** as used in this Ordinance Code, is an imperative requirement.

1.45. **“Well Flushing”** means the act of temporarily discharging extracted groundwater through a connection located upstream of the water distribution system at the beginning of an extraction cycle. Well flushing is typically performed until the quality of the extracted water is suitable for beneficial use and/or will not damage the distribution system. In some cases, the flushing flows may be discharged upstream of the distribution system, including the flowmeter. Flushing flows discharged upstream of the flowmeter shall be estimated and reported to the Agency in accordance with the requirements accordance with the requirements in Chapter 2 of the Ordinance Code.

1.46. **“Well Rehabilitation”** means the act of restoring a well to its most efficient condition by various treatments, development, or reconstruction methods. In most cases, groundwater extracted during well rehabilitation is not discharged through the extraction facility piping and, consequently, is not flowmetered. In these cases, the volume of water extracted shall be estimated and reported to the Agency in accordance with the requirements accordance in Chapter 2 of the Ordinance Code.

1.47. **“West Las Posas Basin”** is that part of the former North Las Posas Basin that is west of the subsurface anomaly described by significant changes in groundwater levels, as described in the Groundwater Management Plan and located for record purposes on maps as provided in Section 1.20.

CHAPTER 2.0
Registration of Wells and Levying of Charges

2.1. Registration of Wells

2.1.1. Agency Water Well Permit Requirement (No-Fee Permit) – All new extraction facilities constructed within the Agency Boundary shall obtain a no-fee permit from the Agency prior to the issuance of a well permit by the County.

2.1.2. Registration Requirement – All groundwater extraction facilities within the boundaries of the Agency shall be registered with the Agency within 30 days of the completion of drilling activities or within 30 days after notice is given to the operator of such facility. No extraction facility may be operated or otherwise utilized so as to extract groundwater within the Agency Boundary unless that facility is registered with the Agency, flowmetered and permitted, if required, and all extractions reported to the Agency as required. The operator of an extraction facility shall register his extraction facility and provide in full, the information required to complete the form provided by the Agency that includes the following:

2.1.2.1. Name and address of the operator(s).

2.1.2.2. Name and address of the owner(s) of the land upon which the extraction facility is located.

2.1.2.3. A description of the equipment associated with the extraction facility.

2.1.2.4. Location, parcel number and state well number of the water extraction facility.

2.2. **Change in Owner or Operator** - The name of the owner of each extraction facility, the parcel number on which the well is located along with the names of all operators for each extraction facility shall be reported to the Agency within 30 days upon any change of ownership or operators, together with such other information required by the Executive Officer.

2.3. **Reporting Extractions** - All extractions shall be reported to the Agency. All extractions shall be flowmetered in accordance with the requirements and methods for flowmetering extractions as specified by Chapter 3. In cases where flowmetering is not required, the volume of water extracted shall be estimated and reported to Agency. The Agency shall send a “Semi-Annual Groundwater Extraction Statement” form to each well operator on or about the first week of January and the first week of July each year. Each operator of a registered extraction facility shall enter the necessary information and return the “Semi-Annual Groundwater Extraction Statement” covering all wells they operate on or before the due date. Statements are due on or before February 1st or August 1st annually or thirty days after the date of the letter requesting submittal of the Semi-Annual Statement for the given period. Statements shall contain the following information on forms provided by the Agency:

2.3.1. The information required under Section 2.1.2 above.

2.3.2. The method of measuring or computing groundwater extractions.

2.3.3. The crop types or other uses and the acreage served by the extraction facility.

2.3.4. Total extractions from each extraction facility in acre-feet for the proceeding six (6) month period.

2.4. **Groundwater Extraction Charges**

2.4.1. All persons operating groundwater extraction facilities shall pay a groundwater extraction charge for all groundwater extracted after July 1, 1993, in the amount as established by Resolution. Payments are due semi-annually, and shall accompany the statement required pursuant to Section 2.3.

2.4.2. Payments are due forty-five (45) days after the billing date, and payments not received or postmarked by such date due shall be charged interest from and after such date due until payment thereof at the rate of 1.5 percent per month, or part of month that the charge remains unpaid. Late Penalty. The operator shall pay a late penalty for any extraction charge not satisfied by the due and payable date. The late penalty shall be 1½ percent per month, or any portion thereof, of the amount of the unsatisfied extraction charge. The late penalty shall not exceed 100% of the original charge, provided the penalty is paid within 60 days of the due date. If the fee is not paid within the 60 days, the penalty will continue to accrue at 1.5 percent per month with a final maximum of 200% of the original penalty due.

2.4.3. Owners of extraction facilities are ultimately responsible for payment of pumping charges and penalties should an operator not pay. Consequently, owners are charged with providing for this liability in agreements entered into with well operators and water users.

2.5. **Collection of Delinquent Extraction Charges and Late Penalties** - The Board may order that any given extraction charge and/or late penalty shall be a personal obligation of the operator or shall be an assessment against the property on which the extraction facility is located. Such assessment constitutes a lien upon the property, which lien attaches upon recordation in the office of the County Recorder. The assessment may be collected at the same time and in the same manner as ordinary ad valorem taxes are collected, and shall be subject to the same penalties and the same procedure and sale, in case of delinquency as provided for such taxes. All laws applicable to the levy, collection and enforcement of ad valorem taxes shall be applicable to such assessment, except that if any real property to which such lien would attach has been transferred or conveyed to a bona fide purchaser for value, or if a lien of a bona fide encumbrance for value has been created and attaches thereon, prior to the date on which the first installment of such taxes would become delinquent, then the lien which would otherwise be imposed by this section shall not attach to such real property and an assessment relating to such property shall be transferred to the unsecured roll for collection.

2.6. **Use of Extraction Charges and Late Penalties** - Revenues generated from extraction charges and late penalties shall be used exclusively for authorized Agency purposes, including financial assistance to support Board approved water supply, conservation, monitoring programs and water reclamation projects that demonstrate significant reductions in overdraft.

CHAPTER 3.0
Installation and Use of Flowmeters for Groundwater Extraction Facilities

3.1. Installation and Use of Flowmeters

3.1.1. Installation Requirement - Prior to extracting groundwater, the operator shall install a flowmeter. With the exception of connections used for well flushing and extraction facilities used by multiple operators, flowmeters shall be installed upstream of all connections to the main discharge line. Flowmetering is not required during well flushing and well rehabilitation; however, the volume of water extracted shall be estimated and reported to the Agency. Flowmeters are not required on inactive wells as defined in this Ordinance Code, nor are flowmeters required for extraction facilities supplying a single family dwelling on one acre or less, with no income producing operations. If more than one operator uses the same extraction facility, flowmeters shall be installed to record the water use of each operator. Well operators were required to install flowmeters on wells by July 1, 1994.

3.1.2. Flowmeter Failure and Back-up Measurement Requirements - Flowmeters occasionally fail, losing periods of record before the disabled or inaccurate meter is either replaced or repaired. When a flowmeter fails, the operator shall repair or replace the flowmeter within the timeframe specified in a separate Resolution. Flowmeter failures and associated repairs or replacements shall be reported to the Agency together with any other information required by the Executive Officer on or before the due date of the next Semi-Annual Groundwater Extraction Statement. Well operators shall be prepared to provide another acceptable method of computing extractions during these periods of flowmeter failure to avoid the loss of record on wells that require flowmetering under this Ordinance Code.

3.1.3. Back-up Methods - It is the operator's responsibility to maintain the flowmeter. Any allowable or acceptable backup measurement methods will be specified in a separate Resolution and may be changed as technology improves or changes.

3.1.4. Flowmeter Readings - Functional flowmeters shall be read and the readings reported semi-annually on the extraction statements required under Section 2.3 above.

3.1.5. Inspection of Flowmeters - The Agency may inspect flowmeter installations for compliance with this Ordinance Code at any reasonable time.

3.2. **Flowmeter Testing and Calibration** - All flowmeters shall be tested for accuracy at a frequency interval determined by the Board to meet specific measurement standards. Calibration methods and procedures approved by the Board shall be detailed in an adopted Resolution.

3.3. **Altering Flowmeters** - Any person who alters, removes, resets, adjusts, manipulates, obstructs, or in any manner interferes or tampers with any flowmeter affixed to any groundwater extraction facility required by this Ordinance Code, resulting in said flowmeter to improperly or inaccurately measure and record groundwater extractions, is guilty of an intentional violation of this Ordinance Code and will be subject to any and all penalties as described in Chapter 8.

3.4. **Costs of Testing and Calibration** - All costs incurred with flowmeter testing or calibration shall be the personal obligation of the well owner. Non-compliance with any provision of the flowmeter calibration requirements will subject the owner to financial penalties and/or liens as described below or in Chapter 8 of the Ordinance Code.

3.5. **Fees and Enforcement** - If any water production facility within the Agency's boundaries is used to produce water without a flowmeter or with a non-operating flowmeter in excess of the allowable timeframe specified in a separate Resolution, the Agency shall assess a Non-Metered Water Use Fee against the water production facility owner. The amount of the fee shall be calculated as follows:

3.5.1 Groundwater extraction facilities - The fee shall be equal to double the current groundwater extraction charge for all estimated water used. Estimates of water used shall be calculated by the operator and approved by the Executive Officer. Any delinquent extraction charge obligations shall also be charged interest at the rate of 1.5 percent per month on any unpaid balances.

3.6. Upon violation of any flowmeter provision, the Agency may, as allowed by law, petition the Superior Court of the County for a temporary restraining order or preliminary or permanent injunction prohibiting the well owner from operating the facility or for such other injunctive relief as may be appropriate.

CHAPTER 4.0
Protection of the Las Posas Basins

4.1. **This chapter has the following purpose and intent:**

4.1.1. To eliminate overdraft from the aquifer systems within the boundary of the East and West Las Posas basins and bring these basins to a “safe yield” condition by the year 2010.

4.1.2. To protect the Las Posas outcrop as a source of groundwater recharge into the East and West Las Posas basins.

4.1.3. To prevent groundwater quality degradation of the East and West Las Posas basins by influence from the Expansion area.

4.1.4. This Ordinance Code is only one means by which these goals will be met.

4.2. Anti-degradation and Extraction Prohibition

4.2.1. Extraction Facility Permits.

4.2.1.1. Permit Required - Prior to: (a) initiating any new or increased use of groundwater in the Expansion area, obtained from any source within the Agency including the Expansion area; or (b) constructing a new or replacement extraction facility in the East or West Las Posas basins, or the Expansion area, a permit must be obtained from the Agency as provided in this Chapter. For the purpose of this Chapter, a new or increased use is that which did not exist or occur before June 30, 1988.

4.2.1.2. Permit Application - Application shall be made to the Agency on the approved County Water Well Ordinance form available from the County Public Works Agency and shall include all information required by the County Well Ordinance and the following:

4.2.1.2.1. Location of each water well to be used, along with the associated state well number.

4.2.1.2.2. Location(s) of groundwater use, including acreage accurately plotted on copy of the County Assessor's Parcel Map.

4.2.1.2.3. The proposed crop type(s) or Municipal and Industrial use(s) at each location.

4.2.1.2.4. A brief description of the type of irrigation or distribution system and flowmeter to be used.

4.2.1.2.5. The estimated average annual quantity of water use proposed for each location of use.

4.2.1.2.6. An identification of the source of historical allocation to supply the proposed water use by the well.

4.2.1.2.7. An analysis of the potential impacts on the water balance in the Las Posas Basins resulting from the proposed use(s).

4.2.1.3. Findings - A permit may only be granted if the Executive Officer finds that the proposed groundwater use will result in no net detriment to the East or West Las Posas Basins by determining that:

4.2.1.3.1. The Las Posas outcrop is not exposed to potential degradation of water quality of any type, and

4.2.1.3.2. Recharge to the East and West Las Posas Basins from the Las Posas outcrop is not diminished, and

4.2.1.3.3. Neither baseline nor efficiency allocation will be used, directly or indirectly, to support groundwater use on the Expansion Area, and (an example of indirect use is using efficiency to supply a demand inside the Agency and using the replaced historical allocation on the outcrop)

4.2.1.3.4. No increased or new uses of groundwater from inside the Agency Boundary will be applied on any area outside the Expansion area (or outside the East or West Las Posas boundary).

4.2.1.4. Permit Conditions. The Executive Officer may include in the permit granted, any conditions consistent with the purpose of this Chapter, including:

4.2.1.4.1. Any proposed agricultural use shall include the installation of irrigation systems that employ irrigation best management practices consistent with then current industry standards.

4.2.1.4.2. Any proposed municipal or industrial use shall include the installation of systems that employ municipal and industrial best management practices consistent with the then current industry standards.

4.2.1.4.3. A permit term, not to exceed 10 years from the date of issuance.

4.2.1.4.4. Mitigation, monitoring, and periodic reporting, as may be appropriate given the proposed use.

4.2.2. Permit Renewal - Permits may be renewed pursuant to the requirements of Section 4.2.1.

4.3. **Registration of Existing Uses** - The owners of groundwater wells located within the East or West Las Posas basins shall register their wells with the Agency no later than January 1, 2006, through the following procedure:

4.3.1. Registration Form - The Agency shall make available a registration form which shall be completed, and filed with the Agency for each well, which shall include the following:

4.3.1.1. Location(s) of all water well(s), along with the associated state well number(s) including offsite well(s) serving the proposed use. Information concerning wells shall also include any other use for the water well.

4.3.1.2. Location(s) of groundwater use for the well including acreage accurately plotted on a copy of the County Assessor's Parcel Map.

4.3.1.3. The proposed crop type(s) or Municipal and Industrial use(s) at each location.

4.3.1.4. A brief description of the type of irrigation or distribution system and flowmeter in use.

4.3.1.5. The estimated average annual quantity of water use at each location and for each well.

4.4. **Monitoring** - The Agency shall monitor compliance with this Chapter by reviewing County well permit applications and reported groundwater extractions and by conducting field surveys as may be necessary.

4.5 **Unreasonable Uses** - The Agency may commence and prosecute legal actions to enjoin unreasonable uses or methods of use of water within or without the Agency Boundary to the extent those uses or methods of use adversely affect the groundwater supply within the Agency Boundary.

CHAPTER 5.0
Reduction of Groundwater Extractions

5.1. **Purpose** - The purpose of this Chapter is to eliminate overdraft from the aquifer systems within the boundaries of the Agency and bring the groundwater basins to safe yield by the year 2010. It is not the purpose of this Chapter to determine or allocate water right entitlements, including those, which may be asserted pursuant to California Water Code sections 1005.1, 1005.2 or 1005.4.

5.2. **Extraction Allocations**

5.2.1. General Limitations

5.2.1.1. The Executive Officer shall establish an operator's extraction allocation for each extraction facility located within the Agency Boundary. The extraction allocation shall be the historical extraction as reported to the United Water Conservation District and/or to the Agency pursuant to Chapter 2 (or its successor), reduced as provided by Section 5.4, or as otherwise provided for in Section 5.6 of this Ordinance Code. An alternative allocation, either baseline or efficiency, may also be approved as explained in Sections 5.6.1.1 and 5.6.1.2. All extraction facilities have an allocation of zero unless the Executive Officer determines otherwise. The operator may determine whether the annual allocation used shall be either a combination of baseline and historical allocation, or based on an efficiency allocation. All wells used by an operator in any given basin shall be operated on either a combination of historical and baseline or an efficiency allocation except water purveyors as approved by the Executive Officer. As explained by Section 5.6.1.2, an efficiency allocation may not be combined with either a baseline or a historical allocation. Extraction allocations may be adjusted or transferred only as provided in Section 5.3.

5.2.1.2. Regardless of allocation, the total water use for agricultural purposes must be at least 60 percent efficient as determined by the formula described in Section 5.6.1.2.4. This 60 percent irrigation efficiency is totally unrelated to the 80 percent efficiency described in Section 5.6.1.2, “Annual Efficiency Extraction Allocation”.

5.2.1.3. Where an operator operates more than one extraction facility in the same basin, the extraction allocations for the individual facilities may be combined.

5.2.1.4. Where there is more than one operator for any agricultural extraction facility, each operator shall be entitled to a pro rata share of the facility's historical allocation based on either usage or acreage irrigated during the historical extraction period. Such pro rata shares shall be determined by the owner of the extraction facility, and this determination shall be subject to the approval of the Executive Officer.

5.2.1.5. When an operator is no longer entitled to use an extraction facility, that operator is no longer entitled to any portion of the extraction allocation attributed to that extraction facility.

5.2.1.6. A historical allocation is assigned to an extraction facility and a baseline allocation is assigned to the land, both may be used, but neither is owned by the operator.

5.2.1.7. Where there is a sale or transfer of a part of the acreage served by any extraction facility, the extraction allocation for that facility shall be equitably apportioned between the real property retained and the real property transferred by the owner of the extraction facility, This apportionment shall be approved by the Executive Officer who may modify the apportionment to assure equity.

5.2.1.8. The name of the owner of each extraction facility, the parcel number on which the well is located along with the names of all operators for each extraction facility shall be reported to the Agency with each semi-annual statement and within 30 days of any change of ownership or operators, together with such other information required by the Executive Officer.

5.2.1.9. The Executive Officer may, on written request from a land owner or well operator, waive allocation requirements for the extraction of groundwater from the Perched or Semi-perched aquifer of Sealing Zone III when the pumping of that groundwater is specifically for the purpose of lowering the water table to reduce the high water table threat to property, including the root zone of crops, or for dewatering construction sites. The Executive Officer shall require that the groundwater extraction facility used for this purpose be perforated only in the Perched or Semi-perched zone, and shall also require the landowner and/or the operator to protect the Agency from damage potentially caused by transferring water to another location.

5.2.2. General Limitations: Special Board Approval Requirements - Notwithstanding any other provisions of this Ordinance Code, the following uses of water resources associated with the aquifers within the Agency may only be undertaken with prior Board approval of and subject to the conditions and restrictions established by the Board.

5.2.2.1. Direct or indirect export of groundwater extracted from within the Agency Boundary for use outside the Agency Boundary.

5.2.2.2. The direct or indirect use of surface water or Foreign Water from within the Agency outside the Agency in a manner that may adversely affect the groundwater supply within the Agency.

5.2.2.3. Application to the Board - To obtain the approval of the Board for any use provided in Sections 5.2.2.1 and 5.2.2.2, application shall be made to the Agency describing the details of the proposed use, including all the following information:

5.2.2.3.1. The location of each water well to be used, along with the associated state well number, and/or the location of each surface diversion and a description of the associated water right.

5.2.2.3.2. Location(s) of groundwater use, including acreage, accurately plotted on copy of the County Assessor's Parcel Map.

5.2.2.3.3. The proposed crop type(s) or Municipal and Industrial use(s) at each location.

5.2.2.3.4. A brief description of the type of irrigation or distribution system and flowmeter to be used.

5.2.2.3.5. The estimated average annual quantity of water use proposed for each location of use.

5.2.2.3.6. An identification of the source of historical allocation, if any, to supply the proposed water use by the well.

5.2.2.3.7. An analysis of the potential impacts on the water balance in any Basin or Subbasin within the Agency Boundaries resulting from the proposed use(s).

5.2.2.4. Findings - The Board may approve the proposed use if, after a public hearing, it finds that the proposed use will result in no net detriment to the Basin, or any subbasin, or aquifer associated with the use, by determining that:

5.2.2.4.1. The proposed use does not result in the material degradation of water quality of any type, or

5.2.2.4.2. Recharge to any aquifer within the Agency is not materially diminished.

5.2.2.4.3. In granting approval to projects subject to this subsection, the Board may impose any conditions as may be appropriate, including limitations on the quantity of water use, term of the approval, and periodic reporting to the Agency.

5.2.3. An operator shall comply with all provisions of this Ordinance Code and Resolutions prior to receiving an extraction allocation.

5.3. **Adjustments to Extraction Allocations**

5.3.1. Adjustments to extraction allocations may be necessary to provide some flexibility, while still maintaining the goal of reaching a safe yield condition by the year 2010. Adjustments may be accomplished by a transfer, an assignment of historical extraction allocation, or a demonstration of a new water source.

5.3.2. Subject to the provisions in this Section 5.3, transfers of extraction allocation are authorized provided they result in no net detriment to the Basins within the Agency. In making this determination, consideration shall be given to the location of extraction facilities, the aquifer systems being used, potential groundwater quality impacts, and the overall assessment of the cumulative impacts of transfers of extraction allocation.

5.3.3. Types of Transfers of Allocation. When irrigated agricultural land(s) changes to M & I use, a basic extraction allocation of 2 acre-feet per acre shall be transferred. In addition, a historical extraction allocation shall be transferred from the agricultural extraction facility(s) operators to the M & I provider in accordance with the following conditions:

5.3.3.1. When the extraction facility is located on the land transitioning and did not serve other land during the historical allocation determination period, the M & I Operator shall receive a historical extraction allocation of 2 acre-feet per acre per year for the acreage transitioning to M & I use. Any historical allocation in excess of 2 acre-feet per acre for the land transitioning to M & I use shall be eliminated.

5.3.3.2. When the extraction facility is located on the land transitioning and served other land during the historical allocation determination period, the historical allocation associated with the transitioning property shall be allocated on a pro rata basis by acreage to the total property served. The pro rata share for the property transitioning shall be eliminated. Two acre-feet per acre per year, based upon the acreage being transferred, shall be provided to the M & I provider.

5.3.3.3. When the extraction facility serving the lands transitioning is not located on the land transitioning, the Executive Officer shall determine the allocation on an equitable basis for the remaining properties not transitioning to M & I. Two acre-feet per acre per year, based upon the acreage being transferred, shall be provided to the M & I provider.

5.3.3.4. The transfer shall be effective upon the approval of the Executive Officer, taking into account the ongoing use of the property.

5.3.3.5. Allocation originating from an agricultural extraction facility shall not be transferred to an M & I use except as provided in this Section 5.3.3.

5.3.4. Allocation may be transferred between M & I extraction facilities provided there is no net detriment to the aquifer system. In making this determination, the Executive Officer shall, at a minimum, consider the location of extraction facilities, the aquifer system being used and groundwater quality impacts of the transfer.

5.3.5. Transfer of Allocation - Upon request, the Executive Officer may transfer allocation from one agricultural operator to another agricultural operator or from one M & I operator to another M & I operator provided there is no net detriment to the basins and the transfer is equitable. The transfer of allocation will be of indefinite duration, approved on a "case-by-case" basis, and the Executive Officer shall determine the rate of extraction and the point or points of extraction. Requests for the transfer of allocations shall be submitted jointly by the parties involved and shall include the specific details of their proposal. To ensure that there is no net detriment to the aquifer systems, transfers of allocation shall be subject to other conditions as approved by the Board. Transfers of allocation from Agricultural use to M & I use shall only be approved as provided by Section 5.3.3.

5.3.6. The Executive Officer may approve a temporary assignment of allocation from one operator to another operator when there is no net detriment to the aquifer system. The temporary assignment shall not exceed one year.

5.3.7. Adjustments to M & I Allocations - The Board may adjust the historical allocation of an M & I operator when that operator has supplied groundwater to either an agricultural or M & I user during the historical allocation period and discontinues service to that user. This adjustment may be made by transferring the supplied portion of the historical allocation from the M & I operator to the new user. This adjustment will avoid increased pumping due to windfall allocations that could otherwise result when the M & I operator discontinues service. To avoid retroactive inequities, where an M & I operator has discontinued service to a user prior to July 1, 2005, the amount of the supplied portion of the historical allocation may be allocated to both the M & I operator and the user.

5.3.8. Historical allocation is subject to adjustment as provided in Section 5.4 below.

5.3.9. Procedures for Adjustment

5.3.9.1. It shall be necessary for the operator of the extraction facility to file a verified Application for Adjustment with the Executive Officer.

5.3.9.2. Adjustments of extraction allocations, pursuant to the Applications for Adjustment, shall be considered for approval by the Board after reviewing the findings and recommendations of the Executive Officer and, if approved, shall be effective for the remainder of the calendar year and for all subsequent calendar years until modified by a subsequent Board approved adjustment.

5.4. **Reduction of Extraction Allocations**

5.4.1. Historical extraction allocations, adjusted or otherwise, shall be reduced in order to eliminate overdraft from the aquifer systems within the boundaries of the Agency for agricultural and M & I uses. The reductions shall be as set forth below:

1992 - 1994 extraction allocation = 95% of historical extraction, as adjusted.
1995 - 1999 extraction allocation = 90% of historical extraction, as adjusted.
2000 - 2004 extraction allocation = 85% of historical extraction, as adjusted.
2005 - 2009 extraction allocation = 80% of historical extraction, as adjusted.
After 2009 extraction allocation = 75% of historical extraction, as adjusted.

5.4.2. Following the appropriate public review, the Board may exempt historical extraction allocations from these adjustments on a basin-by-basin basis.

5.5. **Exemptions from Reductions**

5.5.1. The following types of extraction allocations are exempt from the reductions set forth in Section 5.4.1:

5.5.1.1. Baseline Extraction Allocations as set forth in 5.6.1.1.

5.5.1.2. Annual Efficiency Extraction Allocations as set forth in 5.6.1.2.

5.5.1.3. Non-metered Extraction Facilities. Reductions in extraction allocations shall not apply to those extraction facilities as identified in Chapter 3 that do not require flowmeters. Neither retroactive adjustments nor refunds will be made, except that any outstanding surcharges for non-metered extractions that existed prior to June 26, 2002 will be waived.

5.6. **Alternative Extraction Allocations**

5.6.1. As an alternative to historical extractions, the Executive Officer may establish a Baseline or an Annual Efficiency extraction allocation for an operator, as follows:

5.6.1.1. Baseline Extraction Allocations. If no historical extraction exists, or the historical allocation is less than one acre-foot per acre per year, a Baseline extraction allocation may be established by the Executive Officer at one acre-foot per acre per year.

5.6.1.1.1. A Baseline Extraction Allocation specifically applies to undeveloped acreage that is being developed and once approved shall remain with that developed acreage. A Baseline allocation may be combined with a historical allocation for commonly operated facilities in the same basin. A baseline allocation shall not be used with an efficiency allocation.

5.6.1.1.2. To obtain a Baseline Extraction Allocation, a detailed report must be submitted to the Executive Officer. The report shall describe the historical extraction of groundwater use, if any, during the period between the end of calendar year 1984 and the end of calendar year 1989, the type (crop type or M & I) and the amount of water use and acreage involved. The report shall include copies of Assessor's maps identifying the parcels where groundwater is presently being used. For the purpose of this ordinance, one (1) acre-foot per acre per year represents a reasonable use of water for a Baseline extraction allocation.

5.6.1.1.3. Application for the initial Baseline Extraction Allocation must be submitted prior to submission of the annual report of pumping. If approved, the Baseline Extraction Allocation shall apply beginning with the current calendar year.

5.6.1.1.4. To facilitate accounting procedures, an operator shall use Baseline Extraction Allocation before using Historical Allocation.

5.6.1.2. Annual Efficiency Extraction Allocation - If an operator can demonstrate to the Executive Officer that water used for agriculturally developed land is at least 80 percent overall irrigation efficient, based on evapotranspiration requirements, an Annual Efficiency extraction allocation shall be established for one calendar year. An 80 percent overall irrigation efficiency has been determined by the Agency to be reasonable on agricultural lands within the Agency's boundaries.

5.6.1.2.1. An Efficiency Allocation may be used when no historical allocation exists or when the historical allocation is not sufficient for the crop being grown. A historical allocation shall not be used in conjunction with an efficiency allocation.

5.6.1.2.2. To prove that irrigation efficiency is at least 80 percent, the operator must submit a detailed report covering a minimum period of the immediately preceding calendar year. This report shall be submitted to the Executive Officer no later than February 1st of the following year unless otherwise extended by the Board. The report shall include a complete crop and irrigation history for the extraction facility and actual acreage irrigated. The report shall include the reference evapotranspiration (ETo) rates and crop factors (Kc) for the calendar year period similar to that provided by the California Irrigation Management Information System (CIMIS) as developed and modified by the California Department of Water Resources. The report shall include a summary sheet that compares the water use to the evapotranspiration requirements for each crop and the corresponding acreage covered in the calendar year. The Board may extend the time to apply for an efficiency allocation for any year.

5.6.1.2.3. Irrigation efficiency will include an appropriate amount of water necessary to avoid salt build-up based on the quality of irrigation water used.

5.6.1.2.4. Irrigation Efficiency (I.E.) will be calculated using the following formula:

$$\text{I.E.} = \frac{[\text{ETo x Kc}] - \text{ER x } 100}{\text{Actual Water Applied (inches)}}$$

Where:

ETo is the reference evapotranspiration measured in inches.

Kc is a crop factor, which is a dimensionless number that relates water use by a given plant in comparison to ETo.

ER is the effective rainfall measured in inches as determined by the Executive Officer.

5.6.2. Exceptions - The Board may grant exceptions to Sections 5.6.1.1 and 5.6.1.2 on a case-by-case basis. However, individual exceptions shall not become the norm. Where agricultural efficiency cannot be measured as set forth in Section 5.6.1.2, then the most efficient practices of record for the type of agricultural use shall be the measurement of efficiency utilized by the Board in its deliberations.

5.7. **Credits**

5.7.1. Credits can be obtained by operators, but are not considered as extraction allocations or adjustments to extraction allocations. Credits are not subject to any reductions as set forth in Section 5.4.1. Credits, if available, shall be used to avoid paying extraction surcharges. Credits shall be accounted for through the normal reporting and accounting procedure and are carried forward from year to year. Except as provided below, credits may be transferred between commonly operated extraction facilities and within the basin where the credits were earned.

5.7.2. The Board may transfer credits between facilities that are not commonly operated within a basin or beyond the basin where such credits were earned, provided that there is no net detriment to the aquifers within the Agency. In determining whether there is no net detriment, the Board may, among other things, consider whether the transfer will help bring the aquifers within the Agency into equilibrium or whether the transfer is a part of an Agency or inter-Agency management plan or program to bring the aquifers of the Agency into balance. Also, in making this determination of no net detriment the Board may consider quality of water as well as the quantity. The transfer of credits will be of indefinite duration, approved on a "case-by-case" basis, and the Executive Officer shall determine the rate of extraction and the point or points of extraction.

5.7.2.1. Requests for the transfer of credits shall be submitted jointly by the parties involved and shall include the specific details of their proposal. To ensure that there is no net detriment to the aquifer systems, transfers of credits shall be subject to other conditions as approved by the Board. Under no circumstances shall credits earned as a result of agricultural use be transferred to an M & I Provider, M & I Operator or an M & I User unless the transfer is specifically approved by the Board and no net detriment to the aquifer systems involved can be shown. Credits earned by an M & I facility shall remain with that facility unless transferred by the Board or transferred as part of a program such as an Agency or inter-Agency management plan or program approved by the Board. The types of credits are:

5.7.2.1.1. Conservation credits - An operator can obtain conservation credits by extracting less groundwater than the historical extraction allocation. Annual Efficiency, Baseline, or an allocation assigned to an extraction facility that is not required to have a flowmeter shall not earn credits. Credits shall be determined by the Executive Officer after receipt of annual extraction data. Subsequent to determining the amount of credits earned, a confirmation shall be mailed to the operator indicating the current allocation, the groundwater extracted during the previous calendar year, and the credits or surcharges for the previous year.

5.7.2.1.2. Storage credits - An operator may obtain storage credits for water that has been determined by the Board to qualify for credits or foreign water stored, injected or spread and percolated or delivered in lieu of pumping in a Board approved injection/storage program used within the Agency Boundary. A written application for approval of a program or an injection/storage facility shall include:

5.7.2.1.2.1. Operator of proposed injection/storage program.

5.7.2.1.2.2. Purpose of proposed injection/storage program.

5.7.2.1.2.3. Location, depth, casing diameter, perforated interval and other information regarding proposed injection/extraction facilities, if applicable.

5.7.2.1.2.4. Method of operation including source, quantity and quality of water, planned scheduling of storage, injection/extraction, delivery or percolation operations and proposed use of extracted water.

5.7.2.1.2.5. Any other information deemed necessary by the Executive Officer.

5.7.3. Following Board approval of the application, successful storage, delivery or injection of water and reporting of results, an operator will obtain credit as determined by the Executive Officer.

5.8. Extraction Surcharges and Late Penalty

5.8.1. Necessity for Surcharges

5.8.1.1. Extraction surcharges are necessary to achieve safe yield from the groundwater basins within the Agency and shall be assessed annually when annual extractions exceed the historical and/or baseline allocation for a given extraction facility or the combined sum of historical allocation and baseline allocation for combined facilities. The extraction surcharge shall be fixed by the Board and shall be based upon (1) the cost to import potable water from the Metropolitan Water District of Southern California, or other equivalent water sources that can or do provide non-native water within the Agency jurisdiction; and (2) the current groundwater conditions within the Agency jurisdiction.

5.8.2. At the discretion of the Board, the extraction surcharge may be structured, tiered, and varied between basins and or aquifers.

5.8.3. The Board shall fix the surcharge by Resolution at a cost sufficiently high to discourage extraction of groundwater in excess of the approved allocation when that extraction will adversely affect achieving safe yield of any basin within the

Agency and may adjust the surcharge by Resolution; provided however, that the then existing extraction surcharge shall remain in effect until adjusted by the Board.

5.8.4. Surcharge for No Allocation - In circumstances where an individual or entity extracts groundwater from a facility(s) having no valid extraction allocation, the extraction surcharge shall be applied to the entire quantity of water extracted. Imposition and acceptance of payment of the surcharge imposed on an individual or entity that extracts water from a facility(s) that holds no extraction allocation shall not be deemed a waiver of the Agency's authority to limit or enjoin the unauthorized extractions.

5.8.5. Efficiency Surcharge Facilities relying on the annual efficiency allocation shall also be subject to surcharge for inefficient use. The extraction allocation for efficiency is the amount of water used at 80% efficiency as defined in 5.6.1.2 of this ordinance. Extraction surcharges will be applied to the difference between the water extracted which correlates with the actual efficiency achieved and the water that would have been extracted to attain the 80% efficiency allocation. For example, an actual efficiency of 70% would be subject to surcharges on the difference between the amount of water used at 70% efficiency and the amount of water that would have been used at 80% efficiency. If an efficiency of less than 60% is achieved, no efficiency allocation will be available, and the operator shall revert to a historical, baseline or to no allocation whichever applies to that facility. Extraction surcharges would then apply to the difference between actual water used and the applicable allocation, if any. For example, a facility operating at an actual efficiency of 59% with no historical or baseline allocation, would be subject to surcharges on all water used.

5.8.6. Payment of Extraction Surcharges

5.8.6.1. Surcharges are assessed annually with respect to the annual allocation and shall become due and payable by the owner/operator on February 1st each year or 30 days after the date shown on the "Semi-Annual Groundwater Extraction Statement." Payments shall be made with credits, if available. The Board may extend the 30-day time allowed to pay surcharges for a period of up to twelve months when circumstances exist that in the opinion of the Board warrant such extension. The Board may also approve the payment of surcharges in installments of up to 24 months with terms suitable to the Board.

5.8.6.2. Late Penalty - The operator shall pay a late penalty for any extraction surcharge not satisfied by the due and payable date. The late penalty shall be 1.5 percent per month, or any portion thereof, of the amount of the unsatisfied extraction surcharge. The late penalty shall not exceed 100% of the original surcharge, provided the penalty is paid within 60 days of billing. If the fee is not paid within the 60 days, the penalty will continue to accrue at 1.5 percent per month with a final maximum of 200% of the original penalty due.

5.8.6.3. Collection of Delinquent Extraction Surcharges and Late Penalties - The Board may order that any given extraction surcharge and/or late penalty shall be a personal obligation of the operator or shall be an assessment against the property on which the extraction facility is located. Such assessment constitutes a lien upon the property, which lien attaches upon recordation in the office of the County Recorder. The assessment may be collected at the same time and in the same manner as ordinary ad valorem taxes are collected, and shall be subject to the same penalties and the same procedure and sale, in case of delinquency as provided for such taxes. All laws applicable to the levy, collection and enforcement of ad valorem taxes shall be applicable to such assessment, except that if any real property to which such lien would attach has been transferred or conveyed to a bona fide purchaser for value, or if a lien of a bona fide encumbrance for value has been created and attaches thereon, prior to the date on which the first installment of such taxes would become delinquent, then the lien which would otherwise be imposed by this section shall not attach to such real property and an assessment relating to such property shall be transferred to the unsecured roll for collection.

5.8.6.4. Use of Extraction Surcharges and Late Penalties - Revenues generated from extraction surcharges and late penalties shall be used exclusively for authorized Agency purposes, including financial assistance to support Board approved water supply, conservation, monitoring programs and water reclamation projects that demonstrate significant reductions in overdraft.

CHAPTER 6.0
Appeals

6.1. Any person aggrieved by a decision or determination made by the Executive Officer may appeal to the Board within forty-five (45) calendar days thereof by filing with the Clerk, or Deputy Clerk, of the Board a written request that the Board review the decision of the Executive Officer. The Board shall equitably act on the appeal within 120 days after all relevant information has been provided by the appellant.

CHAPTER 7.0
Severability

7.1. If any section, part, clause or phrase in this Ordinance Code is for any reason held invalid or unconstitutional, the remaining portion of this Ordinance Code shall not be affected but shall remain in full force and effect.

CHAPTER 8.0
Penalties

8.1. Any operator or other person who violates the provisions of this Ordinance Code is subject to the criminal and civil sanctions set forth in the Agency's enabling act and its Ordinances.

8.2. Any person who intentionally violates any provision of this Ordinance Code shall be guilty of an infraction and may be required to pay a fine to the Agency in an amount not to exceed five hundred dollars ($500).

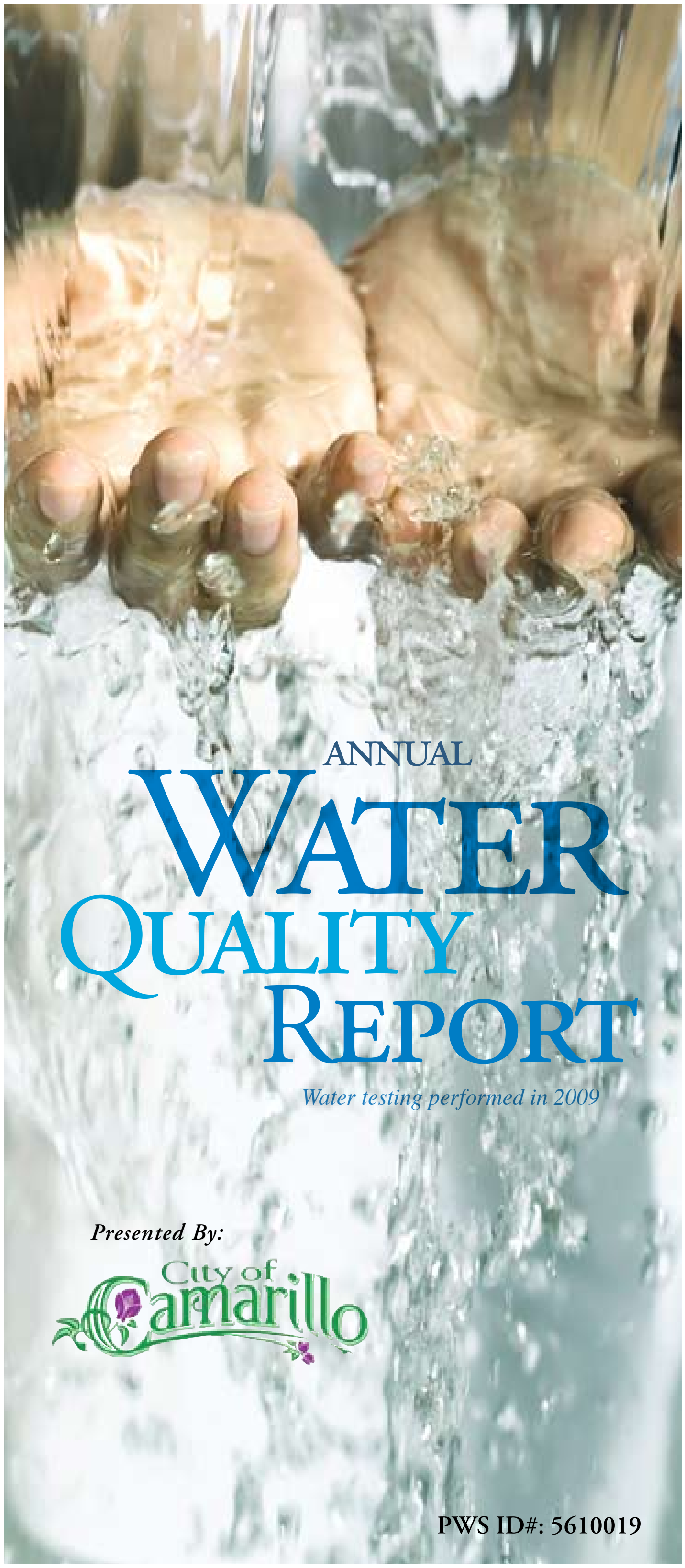
8.3. Any person who negligently or intentionally violates any provision of this Ordinance Code may also be liable civilly to the Agency for a sum not to exceed one thousand dollars ($1,000) per day for each day of such violation, in addition to any other penalties that may be prescribed by law.

8.4. Upon the failure of any person to comply with any provision of this Ordinance Code, the Agency may petition the Superior Court for a temporary restraining order, preliminary or permanent injunction, or such other equitable relief as may be appropriate. The right to petition for injunctive relief is an additional right to those, which may be provided elsewhere in this Ordinance Code or otherwise allowed by law. The Agency may petition the Superior Court of the County to recover any sums due the Agency.

This Ordinance Code and amendments hereof shall become effective on the thirty-first day after adoption.

APPENDIX D
2010 WATER QUALITY REPORT

This Page Left Blank Intentionally



ANNUAL

WATER QUALITY REPORT

Water testing performed in 2009

Presented By:

City of Camarillo

PWS ID#: 5610019

Maintaining High Standards

Once again we are proud to present our annual water quality report. This report covers all testing performed between January 1 and December 31, 2009. The events of the past few years continue to present us with many challenges. One area that has received much of our attention has been to control the negative aesthetic effects of iron and manganese in our groundwater. Many of our local wells produce water that contains these natural minerals. While not harmful to health, they can cause discoloration of the water. In an effort to control these negative aesthetic effects, the City of Camarillo Water Division adds a sequestering agent to the local groundwater that essentially prevents the minerals from becoming visible in the water. Additionally, our local groundwater is blended with imported water supplies delivered by Calleguas Municipal Water District.

To improve water quality in the future, Calleguas Municipal Water District, the City of Camarillo, and other local water agencies are in the planning stages of a regional water treatment plant that will remove iron, manganese, and other naturally occurring minerals that impact the quality of our local groundwater supplies. In the mean time, due to regulatory restrictions on water delivered through the Sacramento/San Joaquin Delta, less imported water is being used to blend with our local groundwater, resulting in higher natural minerals that cause hardness in the City's water supply.

There may be other hurdles in the future, but know that we will always stand behind you and the drinking water we work diligently to provide. We encourage you to share your thoughts with us on the information contained in this report. Should you ever have any questions, we are always available to assist you.

Community Participation

The Camarillo City Council convenes regularly at 5 p.m. on the second and fourth Wednesdays of each month at 601 Carmen Drive. We welcome public interest and participation in decisions affecting drinking water and encourage attendance at these meetings. Visit our Web site at www.ci.camarillo.ca.us for city council agenda information.

Stage 1 Drought Continues

We were very pleased that the first few months of 2010 brought us some much needed rain, greatly decreasing the need to irrigate landscaping, and reducing demand on our water system. Unfortunately, the drought is far from over. It could still take several years of average rainfall to replenish groundwater reserves. Additionally, environmental pumping limits are still in effect in the Sacramento Delta in an effort to protect endangered fish, reducing the amount of water that can be sent to Southern California. Until these issues are addressed, water conservation measures will remain in effect. You can view the entire water conservation ordinance on the City's web page: www.ci.camarillo.ca.us

Source Water Assessment

In May 2001 a Source Water Vulnerability Assessment of the City of Camarillo's three groundwater wells was conducted. The sources have been determined to be vulnerable to contaminants associated with agricultural drainage and irrigation wells, with discharges permitted by the National Pollutant Discharge Elimination System, with storm drains and sewer collection systems, and with gas stations and dry cleaners. Although no contaminants from these activities were detected in the water produced by these wells, they are still considered vulnerable to these nearby activities. A copy of the complete assessment is available by contacting the City of Camarillo Water Division at (805) 388-5373.

Questions?

For more information about this report, or for any questions relating to your drinking water, please call Debbie Schultz, Administrative Specialist, at (805) 388-5373.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or www.epa.gov/safewater/hotline/.

"When the well's dry, we know the worth of water." –*Benjamin Franklin*

Where Does My Water Come From?

City of Camarillo Water Division customers receive local groundwater pumped from the Fox Canyon Aquifer via three city wells, which is blended with imported water from Calleguas Municipal Water District. These three wells have the ability to pump up to 4.4 million gallons per day. One additional well is used only as a back-up in the event of an emergency. In 2009, 42% of the water served to our customers was groundwater, which was an increase of 4% over 2008 to offset the reduction in imported water supplies. The imported water provided by Calleguas originates in northern California and is conveyed over 500 miles through the State Water Project's network of reservoirs, aqueducts and pump stations. After treatment at the MWD Jensen Filtration Plant in Granada Hills, the water is carried by pipeline to Ventura County, where it is distributed by Calleguas to more than a half-million Ventura County customers.

Substances That Could Be in Water

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material and can pick up substances resulting from the presence of animals or from human activity.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (U.S. EPA) and the State Department of Public Health (Department) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk.

Contaminants that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;

Inorganic Contaminants, such as salts and metals, that can be naturally occurring or can result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides, that may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

Organic Chemical Contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and which can also come from gas stations, urban stormwater runoff, agricultural applications, and septic systems;

Radioactive Contaminants, that can be naturally occurring or can be the result of oil and gas production and mining activities.

More information about contaminants and potential health effects can be obtained by calling the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Lead and Drinking Water

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Radon

Radon is a radioactive gas that you can't see, taste, or smell. It is found throughout the United States. Radon can move up through the ground and into a home through cracks and holes in the foundation. Radon can build up to high levels in all types of homes. Radon can also get into indoor air when released from tap water from showering, washing dishes, and other household activities. Compared to radon entering the home through soil, radon entering the home through tap water will in most cases be a small source of radon in indoor air. Radon is a known human carcinogen. Breathing air containing radon can lead to lung cancer. Drinking water containing radon may also cause increased risk of stomach cancer. If you are concerned about radon in your home, test the air in your home. Testing is inexpensive and easy. Fix your home if the level of radon in your air is 4 picocuries per liter of air (pCi/L) or higher. There are simple ways to fix a radon problem that aren't too costly. For additional information, call the EPA's Radon Hotline (800-SOS-RADON).

Sampling Results

During the past year we have taken hundreds of water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The tables below show only those contaminants that were detected in the water. The state allows us to monitor for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

				City of Camarillo		Calleguas Municipal Water District			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	PHG (MCLG) [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum[1] (ppb)	2009	1000	600	NA	NA	67.76	ND–100	No	Erosion of natural deposits; residue from some surface water treatment processes
Arsenic (ppb)	2009	10	0.004	1.5	ND–3.0	3.13	ND–5	No	Erosion of natural deposits; runoff from orchards; glass and electronics production wastes
Barium (ppm)	2009	1	2	0.06	0.047–0.07	NA	NA	No	Discharges of oil drilling wastes and from metal refineries; erosion of natural deposits
Bromate (ppb)	2009	10	(0)	NA	NA	6.07	ND–12	No	By-product of drinking water disinfection
Chlorine[2] (ppm)	2009	[4.0 (as Cl2)]	[4 (as Cl2)]	1.1	0.2–1.9	2	1.6–1.9	No	Drinking water disinfectant added for treatment
Chromium (ppb)	2009	50	(100)	ND	ND–2	NA	NA	No	Discharge from steel and pulp mills and chrome plating; erosion of natural deposits
Fluoride (ppm)	2009	2.0	1	0.23	0.1–0.36	0.8	0.7–0.8	No	Erosion of natural deposits; water additive that promotes strong teeth; discharge from fertilizer and aluminum factories
Gross Alpha Particle Activity (pCi/L)	2009	15	(0)	10	ND–20.4	2.99	ND–8.4	No	Erosion of natural deposits
Gross Beta Particle Activity (pCi/L)	2009	50	(0)	NA	NA	ND	ND–5.2	No	Decay of natural and man-made deposits
Haloacetic Acids[2,3] (ppb)	2009	60	NA	5.6	2.5–9.4	4	ND–9	No	By-product of drinking water disinfection
Nickel (ppb)	2009	100	12	4	ND–8	NA	NA	No	Erosion of natural deposits; discharge from metal factories
Nitrate [as nitrate] (ppm)	2009	45	45	NA	NA	0.70	ND–0.9	No	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Selenium (ppb)	2009	50	(50)	2	ND–4	0.72	ND–8	No	Discharge from petroleum, glass, and metal refineries; erosion of natural deposits; discharge from mines and chemical manufacturers; runoff from livestock lots (feed additive)
TTHMs [Total Trihalomethanes][2,3] (ppb)	2009	80	NA	13.8	3.1–37	23	7–30	No	By-product of drinking water chlorination
Turbidity (NTU)	2009	TT	NA	NA	NA	0.12	0.06–0.12	No	Soil runoff
Uranium (pCi/L)	2009	20	0.43	3.3	ND–7.5	2.13	ND–18.2	No	Erosion of natural deposits

Tap water samples were collected for lead and copper analyses from sample sites throughout the community							
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2007	1.3	0.3	0.67	0/38	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Lead (ppb)	2007	15	2	3	0/38	No	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers; erosion of natural deposits

SECONDARY SUBSTANCES

				City of Camarillo		Calleguas Municipal Water District			
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	SMCL	PHG (MCLG)	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Aluminum[1] (ppb)	2009	200	NS	NA	NA	67.76	ND–100	No	Erosion of natural deposits; residual from some surface water treatment processes
Chloride (ppm)	2009	500	NS	133	69–170	77.47	37–92	No	Runoff/leaching from natural deposits; seawater influence
Color (Units)	2009	15	NS	5	ND–10	1.42	ND–13	No	Naturally occurring organic materials
Copper (ppm)	2009	1.0	NS	ND	ND–0.0012	NA	NA	No	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives
Corrosivity (Units)	2009	Non-corrosive	NS	12.9	12.7–13	NA	NA	No	Natural or industrially influenced balance of hydrogen, carbon and oxygen in the water; affected by temperature and other factors
Iron (ppb)	2009	300	NS	280	100–690	NA	NA	No	Leaching from natural deposits; industrial wastes
Manganese[4] (ppb)	2009	50	NS	108	47–210	2.79	ND–40	No	Leaching from natural deposits
Odor–Threshold (Units)	2009	3	NS	NA	NA	1.76	ND–2	No	Naturally occurring organic materials
Specific Conductance[4] (μS/cm)	2009	1,600	NS	1790	1100–2370	596.35	570–747	No	Substances that form ions when in water; seawater influence
Sulfate[4] (ppm)	2009	500	NS	570	240–880	70.10	56–158	No	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids[4] (ppm)	2009	1,000	NS	1310	740–1790	336.42	310–470	No	Runoff/leaching from natural deposits
Turbidity (Units)	2009	5	NS	1.6	0.8–2.6	0.06	ND–0.4	No	Soil runoff

UNREGULATED AND OTHER SUBSTANCES

		City of Camarillo		Calleguas Municipal Water District	
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AMOUNT DETECTED	RANGE LOW-HIGH	AMOUNT DETECTED	RANGE LOW-HIGH
Alkalinity (ppm)	2009	237	220–260	91.67	80–140
Bicarbonate (ppm)	2009	257	220–320	NA	NA
Boron (ppb)	2009	487	240–700	200.81	190–300
Calcium (ppm)	2009	194	97–265	31.89	27–66
Corrosivity (Units)	2009	NA	NA	11.99	11.7–12.1
Hardness (Total Hardness) (ppm)	2009	694	350–962	130	120–235
Magnesium (ppm)	2009	51	26–73	12.27	11–17
N-Nitrosodimethylamine (NDMA) (ppt)	2009	NA	NA	4.4	ND–5.6
pH (Units)	2009	7.77	7.5–7.97	8.16	7.3–8.3
Potassium (ppm)	2009	5.9	5–7	3.03	3–4
Radon (pCi/L)	2000	622	334–910	48.42[5]	244–871[5]
Sodium (ppm)	2009	154	100–154	67.31	47–69
Total Organic Carbon (ppm)	2005	0.7	ND–1.2	1.67[5]	0.8–2.6[5]
Vanadium (ppb)	2009	NA	NA	6	4–7

[1] Aluminum has both Primary (health) standards and secondary (aesthetic) standards.

[2] Compliance is based on a running annual average of quarterly distribution samples.

[3] We were required by the U.S. EPA to conduct an evaluation of our distribution system. This is known as an Initial Distribution System Evaluation (IDSE) and is intended to identify locations in our distribution system that have elevated disinfection by-product concentrations. Disinfection by-products (e.g., HAAs and TTHMs) result from continuous disinfection of drinking water and form when disinfectants combine with organic matter that naturally occurs in the source water.

[4] High average due to water pumped from Well A. Water is blended with Calleguas, bringing it into compliance.

[5] Sampled in 2009.

Definitions

AL (Regulatory Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

μS/cm (microsiemens per centimeter): A unit expressing the amount of electrical conductivity of a solution.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs (SMCLs) are set to protect the odor, taste, and appearance of drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. EPA.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NS: No standard

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

pCi/L (picocuries per liter): A measure of radioactivity.

PDWS (Primary Drinking Water Standard): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements and water treatment requirements.

PHG (Public Health Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California EPA.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

ppt (parts per trillion): One part substance per trillion parts water (or nanograms per liter).

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

Este folleto contiene información muy importante sobre su agua potable. Tradúzcalo o hable con alguien que lo entienda bien.

City of Camarillo
601 Carmen Drive
Camarillo, CA 93010

APPENDIX E

ORDINANCES AND RESOLUTIONS

This Page Left Blank Intentionally

CITY OF CAMARILLO WATER SHORTAGE CONTINGENCY PLAN

"CONSERVATION IS NEW WATER"

July 22, 2009

City of Camarillo
Water Shortage Contingency Plan

Table of Contents

List of Tables

Acronyms

AF	Acre-Feet
BMP	Best Management Practice
CCW	Calleguas Creek Watershed
CMWD	Calleguas Municipal Water District
CSD	Camarillo Sanitary District
CUWCC	California Urban Water Conservation Council
FCGMA	Fox Canyon Groundwater Management Agency
IRP	Integrated Resources Plan
IAWP	Interim Agricultural Water Program
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MWD	Metropolitan Water District of Southern California
TDS	Total Dissolved Solids
WASP	Water Supply Allocation Plan
WRP	Water Reclamation Plant
WSDM	Water Surplus and Drought Management Plan

SECTION 1 – INTRODUCTION

This Water Shortage Contingency Plan is applicable to all customers and users of water supplied by the City of Camarillo. In the event of prolonged drought, natural disaster or water failures, this document will be a tool to manage limited water supplies, both local groundwater and imported water.

Section 1.1 – Background

Demographic Factors: The City of Camarillo (City) is located in the Pleasant Valley portion of the Oxnard Plain, 9 miles inland from the Pacific Ocean, and 45 miles northwest of the City of Los Angeles. The City is situated in the southern portion of Ventura County, and is surrounded by open hills, mountains, and agricultural lands. The majority of the City is approximately 150 feet above mean sea level while the northern foothill regions are as high as 360 feet above mean sea level.

The City was incorporated in 1964. Since that time, the City Water Division has supplied water to approximately 60% of the community. The remaining 40% of the City's residents are served by the Camrosa Water District and other water providers (California-American Water Company, Crestview Mutual Water Company, Pleasant Valley County Water District, and the Pleasant Valley Mutual Water Company). The total incorporated area of the City is approximately 12,186 acres. The City Water Division serves approximately 9,100 acres while the Camrosa Water District and the other water providers serve the remaining 3,100 acres.

Since 1977, California has experienced droughts in which counties throughout the State adopted ordinances suspending all residential and commercial landscape watering throughout the duration of the water shortage. The local region experienced a prolonged drought from 1987 through 1992. The City met its customers' needs through careful conjunctive management of groundwater and local reservoir supplies, and by applying resources towards water conservation. Additionally, in 1990 the City first adopted a Water Conservation Ordinance that is codified in Municipal Code Chapter 14.12 to improve water conservation. The current version of Chapter 14.12 is attached as Appendix A. The City Code prohibits wasteful water practices such as watering that results in excessive runoff onto paved or hardscaped areas, allowing leaks or breaks to continue more than 72 hours after discovery, the use of a hose without a workable positive shutoff, the watering of lawns between 8 a.m. and 6 p.m., and the serving of water in restaurants without a customer initiated request.

Service Area Profile: The City Water Division manages and operates the Camarillo water system. In 2008, 46,694 residents served by the City Water Division received a blend of 40 percent groundwater and 60 percent imported water provided by the Calleguas Municipal Water District (CMWD), which purchases the water from Metropolitan Water District of Southern California (MWD).

Population Growth: As stated, the City provides water service to approximately 60% of its residents. According to recent population trends, the City's population is increasing at a rate of approximately 2% per year.

Climate: The City has a Mediterranean-type mild coastal climate year-round. Prevailing winds are generally from the southwest at 9 mph. During the fall and winter months, periodic "Santa Ana" wind conditions bring dry warm wind from the northeast. With the ocean only 9 miles to the southwest, coastal fog is not uncommon to the area. The spring, summer, and early fall climate is characteristically governed by an onshore flow of marine air. In the late fall and winter, the coastal high pressures typically shrink and retreat to the southwest. Freezing temperatures occur only occasionally. Temperatures in the 80's frequently result, with temperatures of 90 degrees or more having been recorded. Nearly 85% of the total rainfall occurs from November through March. There is a marked variability in monthly and seasonal totals. The dry climate is characterized by high evaporation rates. This can vary from a minimum average monthly rate of about 2 inches in the winter to a maximum monthly rate of 6 inches in the summer. The estimated annual evapotranspiration rate is between 40-50 inches.

Section 1.2 - Water Conservation Programs & Rebates

Commitment to Conservation: The City maintains that water conservation is a viable and valuable alternative in meeting the water needs of its citizens, and that the citizens of Camarillo have a sincere commitment to environmental concerns and to the conservation of our water resources. Additionally, Municipal Code Chapter 14.12 requires all customer classes to reduce water waste. Therefore, the City has confidence that there will be public support for a continuation of the City's current water conservation programs and policies, along with support for future water shortage actions that may entail water demand reductions as great as fifty percent (50%).

Coordination with Other Agencies: The City is a member of the Ventura County Water Use Efficiency Group – a dedicated group of professionals from local cities and water districts that are concerned about conservation of water resources. This group meets on a regular basis and discusses new methods to save water, various water conservation programs, and the status of conservation efforts. The Water Use Efficiency Group is a valuable organization that provides a cooperative clearinghouse for water conservation ideas and information.

City staff attends conservation related meetings held by the CMWD and MWD. Camarillo also participates and provides additional funding for rebates for water conservation appliances and devices sponsored by CMWD and MWD.

In 1991, the California Urban Water Conservation Council (CUWCC) was created to increase efficient water use statewide through partnerships among urban water agencies, public interest organizations and private entities.

The CUWCC's goal is to integrate fourteen urban water conservation Best Management Practices (BMPs) into the planning and management of California's water resources.

In 1991, the City joined nearly 100 urban water agencies and environmental groups as a signatory to CUWCC's historic Memorandum of Understanding (MOU). Since then, the number of MOU signatories has grown to 398. Those signing the MOU pledge to develop and implement the fourteen BMPs.

Table 1-1 depicts the City's BMP activities and other beneficial water conservation programs that have been initiated since 1991.

Table 1-1: Summary of Best Management Practices

BMP DESCRIPTION	ACTIVITY
1. Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers	Since the previous drought in the early 1900's, the City has conducted interior and exterior water audits at over 2,000 City water customer residences. The audits included the installation of low-flow showerheads, aerators on kitchen and bathroom faucets. Interior and exterior audits were also available to all governmental, commercial and institutional customers.
2. Residential Plumbing Retrofit	The low-flow showerhead exchange program gives customers the opportunity to exchange their high-flow showerheads for low-flow showerheads at no cost.
3. System Water Audits, Leak Detection and Repair	2008 records indicate a 4.14 percent unaccounted-for water loss of the Camarillo Water Division's water production. This is extremely low compared to the industry-accepted average of 10-15 percent. For this reason, Camarillo does not conduct a comprehensive system leak detection program. Camarillo is conscientious about locating and repairing main and service connection leaks when they occur. The Water Conservation Program provides assistance in locating leaks on private property and Section 14.12.030 of the City's Municipal Code prohibits leak duration of more than 72 hours.
4. Metering with Commodity Rates	All service connections are metered under an inclining tiered rate structure.

5. Large Landscape Conservation Programs and Incentives	Large landscape water audits have been conducted at all schools and parks.
6. High-Efficiency Clothes Washing Machine Financial Incentive Programs	High Efficiency Washing Machine rebate programs have been conducted since 2004 through MWD's "So Cal Water Smart Program."
7. Public Information Programs	The "CityScene" newsletter is distributed quarterly and frequently includes water conservation issues. In addition, all new water service customers are given a package containing water conservation materials. The City distributes water conservation information in its monthly water bills, at special events and on the City's website at: www.ci.camarillo.ca.us.
8. School Education Programs	Water Conservation outreach programs to promote student water awareness are conducted by MWD and offered to the Pleasant Valley School District.
9. Conservation Programs for Commercial, Industrial, and Institutional (CII) Accounts	Water Audits and MWD rebate programs are available to each CII customer through the "Save a Buck" program.
10. Wholesale Agency Assistance Programs	This BMP does not apply to the City.
11. Retail Conservation Pricing	The City implements an inclining tiered rate structure.
12. Conservation Coordinator	The City employs one full time Water Conservation Technician, a Conservation Coordinator and budgets for an annual water conservation program.
13. Water Waste Prohibition	The City's Municipal Code prohibits wasteful water practices.
14. ULFT Rebate Program	The City has distributed over 4,700 Ultra Low Flow Toilets (ULFTs) through rebate and direct distribution programs.

Rebates & Websites: MWD and CMWD offer rebates on high efficiency clothes washers, toilets, smart irrigation controllers, sprinkler nozzles, and synthetic turf. The City also provides additional funding to augment the MWD and CMWD rebates on clothes washers, toilets, irrigation timers and sprinkler nozzles. Following is information available on several water conservation websites and programs:

"SoCal Water$mart: SoCal Water$mart is a region-wide water efficiency rebate program sponsored by the MWD that City water customers can take advantage of. The program includes:

a. **High-Efficiency Toilets:** starting at $100
b. **High-Efficiency Clothes Washers:** starting at $85
c. **Weather-Based Irrigation Controllers:** starting at $80/controller for less than 1 acre of landscape; $630/acre for more than 1 acre of landscape
d. **Rotating Sprinkler Nozzles:** starting at $4/nozzle
e. **Synthetic Turf:** starting at $0.30/square foot

SoCal Water$mart provides rebates for residential customers only; residents of single-family detached homes, duplexes, triplexes and fourplexes are eligible. Programs are also available for residents of multi-family units. Customers can visit MWD's website at www.xocalwatersmart.com for more information on available rebates.

"Save A Buck": Local businesses can conserve water and save money through The Save A Buck program that offers cash rebates on a wide variety of water-saving technologies including High-Efficiency Toilets and Urinals, Weather Based and Central Irrigation Controllers for outdoor landscaping as well as many industry specific water-conserving devices.

Funding for the Save A Buck program is through a partnership between MWD and its 26 member agencies throughout Southern California. Their commitment to developing an affordable balance between supply and demand has made "finding" water a mission and the business sector has not only benefited greatly from the program, but has also become a strong partner in water conservation efforts. For more information, interested businesses can visit the Save a Buck website at: www.mwdsaveabuck.com.

"Public Sector Program": Millions of dollars have been earmarked for the Public Sector Water Efficiency Program that provides financial incentives for public agencies to retrofit water thirsty devices.

MWD has increased conservation equipment incentives and is paying them upfront resulting in little to no out-of-pocket expenses.

Devices included in this program are toilets, urinals, cooling tower conductivity controllers, pressurized water brooms, irrigation controllers, spray nozzles and synthetic turf. The City has taken advantage of this program. In 2008/2009, a survey of the City's irrigation systems and City Hall was conducted. The survey outlined several opportunities to conserve water inside buildings and in City-irrigated landscapes.

www.bewaterwise.com: BeWaterWise is an interactive MWD website that is a one-stop shop on the subject of water conservation. City water customers are welcome to visit the site and are encouraged to take advantage of the available programs and information.

"Garden Soft": Camarillo is participating with other local water agencies on a Landscape Efficiency software program that is climate zone specific, which will be available to all City residents. The software will provide information on landscape material selection, planting and water needs just to name a few.

SECTION 2 – SUPPLY & DEMAND

Section 2.1 – Groundwater Sources

Groundwater Management: The City owns four producing water wells that extract water from the Fox Canyon Aquifer. These wells are capable of producing 26.52 AF per day or 9,676 AF per year.

Portions of the Fox Canyon Aquifer are currently in an overdraft condition, and although the basin is not under adjudication, a legal organization called the Fox Canyon Groundwater Management Agency (FCGMA) was created by the California Legislature in 1982 to oversee Ventura County's vital groundwater resources and bring this groundwater basin to safe yield by the year 2015.

In 1989, because of the prolonged drought and groundwater basin overdraft, the FCGMA began preparation of Ordinance No. 5 to reduce groundwater extractions. Article 2 of the Ordinance assigned pumpers groundwater pumping allocations based on their most recent five years (Base Period of 1985 to 1989) of well extraction records. Ordinance 5 has since been superseded by Ordinance 8.1 (Appendix B).

Groundwater Allocation: The Camarillo Water Division's initial allocation as a result of pumping during the Base Period was 3,886 AF but has since been recalculated to reflect well meter inefficiencies. The adjusted new initial allocation is 4,081.80 AF. Table 2.1 depicts the amount of groundwater allocated to the City by the FCGMA per ordinance 8.1.

Chapter 5 of Ordinance 8.1 reduces groundwater-pumping allocations by 25% by 2010. The reduction is one of several measures in the ordinance to bring the basins into safe yield. With the 25% reduction imposed, the Camarillo Water Division would have been allowed to pump only 3,007 AF by the year 2010, based on the 5-year Base Period. The Camarillo Water Division has since acquired additional historical and baseline allocations because of agriculture to municipal use conversions, thus allowing 4,277 AF extractions in year 2010 (see table 2-2). This allocation is expected to further increase as the City continues to convert agricultural lands to municipal and industrial uses.

Table 2-1: Groundwater Allocations
(Acre-Feet)

YEAR	ADJUSTED ALLOCATION (Including historical & baseline transfers)
1991	4,081.80
1992	3,877.71
1993	3,877.71
1994	3,877.71
1995	3,673.62
1996	3,673.62
1997	3,673.62
1998	3,831.85
1999	4,251.86
2000	4,093.54
2001	4,116.44
2002	4,119.10
2003	4,394.80
2004	4,617.84
2005	4,619.90
2006	4,709.26
2007	4,771.15
2008	4,771.15
2009	4,524.28
2010+	4,277.40

Table 2-2: Groundwater Supply After FCGMA Ordinance 8.1 Conservation Reduction
(Acre-Feet)

Year	Original Allocation	Allocation After Conservation Reduction *	Baseline Adjustments	Total Adjusted Groundwater Allocation
2009	4,214.86	3,950.02	574.26	4,524.28
2010	4,214.86	3,703.14	574.26	4,277.40
2011	4,214.86	3,703.14	574.26	4,277.40
2012	4,214.86	3,703.14	574.26	4,277.40

** Conservation reductions per Chapter 5 of the FCGMA Ord. 8.1*

Groundwater Credits: Since the inception of the FCGMA, the City has accumulated conservation credits as a result of allocation transfers and not pumping its full allocation. Those credits are carried over each year and are available for pumping during an emergency or drought. As of December 31, 2008, the City has accumulated 15,072 AF of conservation credits.

Groundwater Quality: Two of the City's four wells (wells A & B) produce water high in salts (total dissolved salts, chloride, sulfate and boron), iron and manganese. These substances (iron, manganese and salts) are listed under secondary water quality standards, are aesthetic related contaminates, and pose no health concerns. As a result, it is necessary to blend the groundwater pumped from these wells with imported supplies, which limits the City from pumping its full annual groundwater allocation.

Section 2.2 – Imported Water

Imported Water Management: The City purchases wholesale imported water supplies from CMWD. CMWD is a member agency of the MWD and purchases wholesale water from MWD. CMWD provides water to the City through eight turnouts located along their 36" transmission main. Total production capability of these turnouts is 70 AF per day or 25,808 AF per year.

On January 1, 2003, the City entered into a purchase order agreement for imported supplies to be provided by CMWD (Appendix C). The purchase order commits the City to purchase 4,945 AF of imported water annually at the Tier 1 rate with a total commitment of 32,967 AF over a 10-year period. Imported water purchased in excess of the Tier 1 amount is available at the higher Tier 2 rate with no quantity limitations.

Effective January 1, 2009 CMWD chose to opt-out of MWD's Interim Agricultural Water Program (IAWP). The IAWP made water available to the agricultural community at a discounted rate when surplus water was available with the understanding that MWD could reduce (callback) agricultural deliveries when surplus water was not available. As a result of the opt-out decision, the City's annual available Tier 1 purchases were increased from 4,945 AF to 5,274 AF.

Table 2-3 depicts forecasted Tier 1 and 2 import water deliveries for the next three years assuming no cutbacks.

Table 2-3: Imported Water Supply Forecast Tier 1 & Tier 2, No Cutbacks (Acre-Feet)

Year	Tier 1	Tier 2	Total
2009	5,274	1,166	6,440
2010	5,274	1,352	6,626
2011	5,274	1,541	6,815
2012	5,274	1,733	7,007

Section 2.3 – Historical Water Demands

Table 2-4 depicts the historical demands for both local groundwater and imported supplies combined. As mentioned in Section 2.1 imported water is necessary to blend with groundwater that contains high levels of salt, iron and manganese. Iron and manganese being secondary water quality contaminates are not harmful to health but can be the cause of discolored water or staining of laundry.

Table 2-4: Historical Groundwater Pumping & Import Water Purchases (Acre-Feet)

Year	Groundwater	Import	Total Demand
2006	3,900	5,679	9,579
2007	4,070	6,361	10,431
2008	3,943	6,315	10,258

As can be seen on the following Tables 2-5 and 2-6, residential and landscape irrigation usage make up over 80% of the total water demands. Thus, the greatest water conservation efforts will be focused on these user categories. During times when droughts are declared on either a statewide or regional-wide basis, the City's water customers will be required to cut back on water usage. The cutbacks on water usage will depend on how severe a drought condition is declared. Specific measures that would be implemented are included Section 4 of this Plan and the City's Water Conservation Ordinance.

Table 2-5: Historical Water Usage By Meter Type (Acre-Feet)

Year	Residential	Comm.	Indus.	Landscape	Ag.	Other	Total
2006	5,457	1,146	157	1,882	456	34	9,132
2007	5,841	1,221	118	2,278	511	27	9,996
2008	5,697	1,208	115	2,195	564	54	9,833
Percent of Total 2008 Demand	**57.93%**	12.28%	1.17%	**22.33%**	5.74%	0.55%	99.45%

Table 2-6: Ranking of Water Usage Percentage Based on Meter Type (Based On 2008 Water Use)

Demand Ranking	Customer Type	Percentage of Total Demand
1	Residential (Single Family & Multi-Family)	57.93%
2	Landscape Irrigation	22.33%
3	Commercial, Institutional (Stores, etc.)	12.28%
4	Agricultural (Farming)	5.74%
5	Industrial (Manufacturing)	1.17%
6	Other (Unaccounted)	.55%

Section 2.4 – Water Usage By Meter Type Forecast

Table 2-7 provides projected total demands for the next three years broken down by meter type. The projected demands are based on a 2.33% average annual increase in demands since the year 2000 with zero conservation levels.

Table 2-7: Demands by Meter Type Forecast (Acre-Feet)

Year	Residential	Comm.	Indus.	Landscape Irrigation.	Ag.	Other	Total
2009	5,830	1,236	118	2,246	577	55	10,062
2010	5,966	1,265	120	2,298	591	57	10,297
2011	6,015	1,294	123	2,352	604	58	10,536
2012	6,247	1,325	126	2,407	618	59	10,782

SECTION 3 – WATER SHORTAGE MANAGEMENT MEASURES

Section 3.1 – Introduction:

The City, CMWD and MWD rely on the delivery of imported water from Northern California to meet the water needs of its customers. Due to the combination of endangered species related court decisions, lack of precipitation and below normal Northern California snowpack, those deliveries are vulnerable to reductions. As a result, imported water purchased by the City may be subject to delivery reductions and higher water costs. Additionally, due to historical over pumping of local groundwater basins, the City may also be required to reduce groundwater pumping beyond the FCGMA 25% conservation reductions. Therefore, the need for water conservation has become essential.

Section 3.2 – MWD's Water Surplus And Drought Management Plan (WSDM Plan)

As part of the implementation of the regional Integrated Resources Plan (IRP), MWD developed a Water Surplus and Drought Management Plan (WSDM) (Appendix D) for Southern California in April 1999. The guiding principle of the WSDM Plan is to manage MWD's water resources and water management programs to minimize the adverse impacts of water supply shortages to retail customers. The WSDM Plan contains specific actions to be taken in drought conditions to meet consumptive demands for water. This plan directs MWD's resource operations to help attain the region's 100% reliability goal. The WSDM Plan was updated in 2004 to account for changes affecting supplies from the Colorado River and California's Bay-Delta. In the past, MWD has developed drought management plans that simply addressed shortage actions and primarily focused on issues of short-term conservation and allocation of imported water. The WSDM Plan recognizes the interdependence of reliability. The overall goal of the WSDM Plan is to ensure that shortage allocations of MWD's imported water supplies is not required.

WSDM Plan Principles and Goals: The guiding principle of the WSDM plan is to manage MWD's water resources and management programs to maximize management of wet year supplies and minimize adverse impacts of water shortages to retail customers. From this guiding principle came the following supporting principles:

a. Encourage efficient water use and economical local resource programs
b. Coordinate operations with member agencies to make as much surplus water as possible available for use in dry years
c. Pursue innovative transfer and banking programs to secure more imported water for use in dry years
d. Increase public awareness about water supply issues

The WSDM plan also declared that if mandatory imported water allocations became necessary, each municipal water agency's allocation would be calculated on the basis of need, as opposed to any type of historical purchases. The WSDM plan contains the following considerations that would go into an equitable allocation of imported water:

a. Impact on retail consumers and regional economy
b. Investments in local resources, including recycling and conservation
c. Population growth
d. Changes and/or losses in local supplies
e. Participation in MWD's Non-firm (interruptible) programs
f. Investment in MWD's facilities

Surplus and Shortage Stages: The WSDM Plan distinguishes between Surpluses, Shortages, Severe Shortages, and Extreme Shortages. Within the WSDM Plan, these terms have specific meanings relating to MWD's ability to deliver water to its customers.

Surplus: MWD can meet full-service and interruptible program demands, and it can deliver water to local, regional and out-of-region storage.

Shortage: MWD can meet full-service demands and partially meet or fully meet interruptible demands, using stored water or water transfers as necessary.

Severe Shortage: MWD can meet full service demands only by using stored water, transfers, and possibly calling for extraordinary conservation. In a Severe Shortage, MWD may have to curtail Interim Agricultural Water Program deliveries.

Extreme Shortage: MWD must allocate available supply to full-service customers. The WSDM Plan also defines five surplus management stages and seven shortage management stages to guide resource management activities. These stages are not defined merely by shortfalls in imported water supply, but also by the water balances in MWD's storage programs. For example, a ten percent shortfall in imported supplies could be a "stage one" shortage if storage levels are high. If storage levels are already depleted, the same shortfall in imported supplies could potentially be defined as a more severe shortage. Each year, MWD evaluates the level of supplies available and existing levels of water in storage to determine the appropriate management stage for that year.

Each stage is associated with specific resource management actions designed to (1) avoid an Extreme Shortage to the maximum extent possible and (2) minimize adverse impacts to retail customers if an Extreme Shortage occurs.

The current sequencing outlined in the WSDM Plan reflects anticipated responses based on detailed modeling of MWD's existing and expected resource mix.

Shortage Actions: When MWD must make net withdrawals from storage to meet demands, it is considered to be in a shortage condition. Under most of these stages, MWD is still able to meet all end-use demands for water. For shortage stages 1 through 4, MWD will meet demands by withdrawing water from storage. At shortage stages 5 through 7, MWD may undertake additional shortage management steps, including issuing public calls for extraordinary conservation, considering curtailment of Interim Agricultural Water Program deliveries in accordance with their discounted rates, exercise water transfer options, or purchase water on the open market. At shortage stage 7, MWD will develop a plan to allocate available supply fairly and efficiently to full-service customers. The allocation plan will be based on the Board's allocation policies. MWD intends to enforce these allocations using rate surcharges.

Section 3.3 – MWD Water Supply Allocation Plan

Guiding Principles: MWD's 1999 WSDM Plan did not include a Water Supply Allocation Plan (WSAP) or implementation approach. It did include a set of principles and considerations for MWD staff to address when developing a specific plan. The WSDM Plan included a guiding principle to be followed in developing any future allocation scheme. As stated in the WSDM plan:

> *"Metropolitan will encourage storage of water during periods of surplus and work jointly with its Member Agencies to minimize the impacts of water shortages on the region's retail consumers and economy during periods of shortage."*

This policy reflects a central desire for allocation schemes that are both equitable and which minimize regional hardship. The specific considerations claimed by the WSDM plan to accomplish an equitable regional allocation of MWD supplies during times of shortage included the following:

a. The impact on retail customers and the economy
b. Allowance for population and growth
c. Change and/or loss of local supply
d. Reclamation/Recycling
e. Conservation
f. Investment in local resources
g. Participation in Metropolitan's non-firm (interruptible) programs
h. Investment in Metropolitan's facilities

Supply Formula and Implementation Elements: The key elements and methodology for calculating a supply allocation have been fully described and documented in a January 2008 Board Report titled “Staff Recommendation for a Water Supply Allocation Plan” (Appendix E).

Conclusion: The recommended WASP plan and implementation elements have been developed through a six-month process in cooperation with the member agencies. The proposal addresses the principles and considerations for allocation approved by the MWD Board through the 1999 WSDM Plan, and is intended as an equitable approach for allocating supplies and minimizing regional impacts should the need arise.

Section 3.4 – Import Water Base Period and Costs

MWD “Base Period”: As a result of the drought beginning in 2006, MWD approved a 15% water delivery cutback effective July 1, 2009. The 15% cutback established a drought management “Base Period” that will be used to calculate penalties related to water usage above the water delivery cutback imposed on MWD’s member agencies and subsequently the City. The base period is an average of the water delivered during the years of 2004-2006 that will be used to calculate reductions in the amount of water that can be purchased under the Tier 1 rate. Water purchased above the reduced limit will be subject to costs exceeding the Tier 2 rate(e.g., two to four times the Tier 2 rate). Table 3-1 depicts the Tier 1 and Tier 2 import water rates effective January 1, 2010.

Table 3-1: Import Water Costs
(Cost per AF)

	Effective January 2009	Effective January 2010
Tier 1	$769	$938
Tier 2	$885	$1,048

Section 3.5 – Water Shortage Mitigation Measures

Introduction: Because of the rising cost and reduced supplies of imported water combined with the FCGMA groundwater pumping restrictions, it is not only prudent, but also essential that the City investigate and implement fiscal and operational changes that can potentially result in the reduction of costs and water demands. Following are several opportunities that the City will investigate and likely implement.

Import Water: As mentioned, the City’s total water deliveries consist of 60% imported supplies. Previous to, and since the beginning of the 2006 drought, water system’s operations have changed and the City’s population has increased. Additionally, the City has continued to fund and administer a water conservation program. As a result, the City is pursuing the following adjustment to the City's base period allocation:

a. **Conservation Efforts:** The City continues to enforce the water conservation measures in Chapter 14.12 that have been in place since 1990. Additionally, the City has sponsored several water conservation programs to include rebates on water conservation devices and outreach programs, (see Table 1-1). An adjustment has been requested as a result of Camarillo's ongoing water conservation efforts.

Groundwater: The Fox Canyon Groundwater Management Agency has placed limitations on the amount of water that can be extracted via wells from the Fox Canyon Aquifer as discussed in Section 2.1. Although the City's wells are capable of producing 9,677 AF per year, GMA Ordinance No. 8.1 limits pumping to 4,524 AF in 2009 (see Table 2-2) further reducing the annual allocation to 4,277 AF in 2010.

Water quality has also been a limiting factor in producing local groundwater supplies. With iron, manganese and salt levels at wells A and B exceeding the Department of Public Health secondary water quality standards, imported water is blended with groundwater at a blending ratio of approximately 40% groundwater to 60% import water to meet water quality standards. The City is considering the following options to increase groundwater pumping capacity:

a. **Pump Groundwater Credits:** As mentioned in Section 2.1, the City has 15,000 of groundwater credits available that can be pumped from any of the City's four wells. Pumping credits have the potential to reduce the demands on imported water supplies by up to 3,000 AF per year.

b. **Well Rehabilitation** Wells that are operating inefficiently will be rehabilitated to restore their pumping capacity.

c. **Partnership With Other Well Owners:** Consideration has been given to developing a partnership with other well owners to augment the City's groundwater pumping capacity. Further investigation is occurring to determine the feasibility of a partnership.

Tiered Rate Structure: Currently, the City has a tiered water rate structure that was implemented in 1990. Since then, the tiered structure has been modified on several occasions. Some of those adjustments include, eliminating special residential rates for hillside irrigation and the elimination of the fourth tier. Tier 1 is the "conservation tier," and successive tiers carry higher charges for use above Tier 1, (See Appendix F for current rates). This rate structure may be further modified due to the lack of water supplies.

Rate Study: With the cost of water rapidly increasing, rate studies should be done to ensure that the City is meeting financial obligations for ongoing operation and maintenance, debt service, and capital improvements while maintaining prudent reserves. Some of the tasks included in a study would include:

a. Adjustment of the rates necessary to compensate for the increase in import water costs, operational costs and capital improvement projects.
b. Equitable rates for reclaimed water.
c. Modify the rate structure, including the addition of additional tiers.
d. Changes to annual operations and maintenance costs and capital improvement projects.

Water Impact Study: Developers may be required to conduct water impact studies that will demonstrate water availability for their project while not increasing water demands and burdens on the City's existing water system and customers.

Conservation Outreach The City has conducted successful water conservation programs with past reductions of total water demand in excess of thirty percent (30%). Various water conservation programs have been initiated as described in Section 1, and other programs are currently underway or under development.

"Conservation is New Water!"

Long Term Solutions: Long-term solutions include additional groundwater storage in the local groundwater basins. CMWD's Las Posas Storage Program has successfully stored approximately 100,000 AF of water in the Las Posas basin. This water will augment import supplies to meet demands during times of drought or other water shortage emergency situations.

The cities of Camarillo, Thousand Oaks and Simi Valley have discussed a regional brackish water treatment plant. The plant would treat local groundwater supplies that are high in iron, manganese and TDS. The treatment of brackish water will reduce the dependence on imported supplies and provide a benefit to the local basins by removing water with high levels of salt.

Reclaimed Water: The Camarillo Sanitary District (CSD) was formed in 1955 to provide wastewater treatment for the majority of what is now the City. The Water Reclamation Plant (WRP) occupies a twenty-acre site on Howard Road next to Conejo Creek. Over the years, the WRP has undergone several modifications to increase its capacity and to incorporate new technologies. The WRP currently treats about 3.9 million gallons per day (MGD) of wastewater, with a maximum capacity of 6.75 MGD. In addition to the treatment plant, the district maintains nearly 158 miles of underground sewer lines and four pump stations. Since the inception of CSD, the treated wastewater has been used for irrigation of adjacent

farmlands and landscaping. The treated effluent that is not reclaimed is discharged into Conejo Creek.

The biosolids that are produced as a result of treatment are used to improve the soil in Kern County, California.

While considering potential uses for recycled water effluent from CSD, public acceptance, and preservation of the CMWD Creek Watershed (CCW) were strong determining factors. In order to develop community support and willingness to fund potential recycled water projects, CSD investigated several options for secondary and tertiary recycled water uses. A consultant was hired to analyze current treatment processes at the WRP to recommend the best secondary and tertiary treatment alternatives and analyze the economics and water quality requirements of potential customers. Additionally, public concern surrounding the poor water quality and growing surcharges from the CCW steadily heightened. It was found that potential uses of the recycled water were limited to agricultural and landscaping purposes.

Detailed analyses indicate that the most favorable project involves an upgrade of the WRP to produce tertiary recycled water to be sold to the Camrosa Water District, and the Pleasant Valley County Water District.

The City has constructed 3,500 feet of 12-inch reclaimed water main under Pleasant Valley Road. This pipeline will deliver reclaimed water from Camrosa Water District's reclaimed water supply line near Adohr Lane. The reclaimed pipeline extends from the connection to Camrosa's system westerly to the intersection of Pleasant Valley Road & Constitution Avenue This project will provide a source of reclaimed water for landscape and agricultural irrigation.

Section 3.6 – Three Year Supply vs. Demand Forecast

Future Water Demand Baseline: For the purpose of determining a baseline for future demands, an 11,000 AF annual demand is used, 6,723 AF of imported water and 4,277 AF of groundwater. 11,000 AF/year is considered a reasonable annual demand baseline considering the average total demands for years 2007 & 2008 was 10,344 AF.

Water Shortage Stages: Based on section 3.2 and the discussion in the following sections, there will be several stages of possible demand reductions that would be applicable to MWD's Water Surplus Drought Management stages and CMWD's Water Shortage stages. These demand reduction levels, as percentages, are summarized in the following table:

Table 3-2: Percentage Demand Reductions

Water Shortage Stages	Percentage Demand Reductions To Meet Shortages
Permanent Restrictions	-
Stage 1 Shortage	15%
Stage 2 Shortage	30%
Stage 3 Shortage	40%
Stage 4 Shortage	50%

The following tables provide the supply vs. demand scenarios consistent with the percentage demand reductions as outlined in table 3-2 from a "No Reduction" to a 50% reduction in supplies. The reductions could be a result of drought or an emergency limiting water production, or combination of both.

Table 3-3: Supply Versus Total Demand
No Reduction in Supply

Year	Total Supply (AF)	Total Demand (AF)	Supply Surplus (AF)	% of Supply Surplus
2009	11,000	10,062	938	8.53%
2010	11,000	10,297	703	6.39%
2011	11,000	10,536	464	4.22%
2012	11,000	10,782	218	1.98%

Demand is at zero conservation level. It is assumed that all groundwater allocation will be pumped and available imported water is 6,723 AF per year.

Table 3-4: Supply Versus Demand – 15 % Reduction
Stage 1

Year	Total Supply (AF)	Total Demand (AF)	Supply Shortage (AF)	% of Supply Shortage
2009	9350	10062	-712	-7.61%
2010	9350	10297	-947	-10.13%
2011	9350	10536	-1186	-12.68%
2012	9350	10782	-1432	-15.32%

Table 3-5: Supply Versus Demand – 30 % Reduction Stage 2

Year	Total Supply (AF)	Total Demand (AF)	Supply Shortage (AF)	% of Supply Shortage
2009	7700	10062	-2362	-30.68%
2010	7700	10297	-2597	-33.73%
2011	7700	10536	-2836	-36.83%
2012	7700	10782	-3082	-40.03%

Table 3-6: Supply Versus Demand – 40 % Reduction Stage 3

Year	Total Supply (AF)	Total Demand (AF)	Supply Shortage (AF)	% of Supply Shortage
2009	6600	10062	-3462	-52.45%
2010	6600	10297	-3697	-56.02%
2011	6600	10536	-3936	-59.64%
2012	6600	10782	-4182	-63.36%

Table 3-7: Supply Versus Demand – 50 % Reduction Stage 4

Year	Total Supply (AF)	Total Demand (AF)	Supply Shortage (AF)	% of Supply Shortage
2009	5500	10062	-4562	-82.95%
2010	5500	10297	-4797	-87.22%
2011	5500	10536	-5036	-91.56%
2012	5500	10782	-5282	-96.04%

SECTION 4 – WATER SHORTAGE CONTINGENCY PLAN

Introduction: As climate conditions and supply sources change over time, so must the City's response to water conservation needs. The Water Shortage Contingency Plan serves as a guide for the City in responding to drought conditions, natural disaster, and reductions in water supplies.

Section 4.1 – Water Use Priorities

Listed below are the priorities for use of available water supplies:

a. Health and Safety – Domestic, sanitation, and fire protection.

b. Commercial, Industrial, and Governmental – Maintenance of economic base.

c. New Demand – Residential, commercial, and industrial.

d. Agricultural – Maintenance of current and permanent crops. (All City agricultural customers are classified as "Interruptible Service").

Section 4.2 – Summary and Administration of Plan

Plan Established: The City is establishing this Plan in response to the drought conditions prevailing throughout California and the City, and the Governor's declaration of a statewide drought.

Compliance with State Law: The Plan is incorporated as part of the City's Urban Water Management Plan. A public hearing was held on July 22, 2009 in regard to the adoption of this Plan by the City Council. (The City Council Resolution adopting the Plan is attached as Appendix G).

Authorization: The City Manager has the ultimate responsibility for the administration of the Plan and related program elements. Delegation of this administration, either in part or whole, is at the discretion of the City Manager. The City Manager, or the Manager's designee, is authorized and directed to implement the applicable provisions of the Plan as determined necessary to fulfill its purposes.

Public Involvement: The City's motto "LAS PERSONAS SON LA CIUDAD," "The People are the City," stands as a statement of the City Council's commitment to the citizens of Camarillo and to the public's involvement in the affairs of the community. City Council members and City staff solicit and promote citizen participation in all water conservation policies and programs.

In association with the philosophy outlined above, the City distributes the "CityScene" newsletter to citizens of the City on a quarterly basis. The CityScene often includes articles on water conservation issues and about various water conservation programs. Water conservation brochures and literature are made available at City Hall and upon request. The City also utilizes water bills for brief water conservation messages and billing envelopes for conservation related bill inserts.

Water Conservation Stages: Water conservation stages ranging from Stage 1 to 4 with increasing target goals of water demand reduction to meet the severity of water shortage conditions are established. Table 4-2 presents the proposed water conservation stages.

Table 4-2: Water Conservation Stages, Conditions & Reduction Goal

Stage	Stage Title	Water Supply Conditions	Demand Reduction Goal
Stage 1	Water Supply Alert, Mandatory Rationing	Total supply is 85-95% of "normal"	15%
Stage 2	Water Supply Shortage, Mandatory Rationing	Total supply is 70-84% of "normal"	30%
Stage 3	Critical Water Supply Shortage, Mandatory Rationing	Total supply is 60-69% of "normal"	40%
Stage 4	Severe Water Supply Shortage, Emergency Condition	Total supply is 50-59% of "normal"	50%

Water Conservation Stage Level Determination: Based on water supply and water demand information, the City Council may by resolution order that the appropriate water conservation stage be implemented or terminated in accordance with the applicable provisions of this section and the relevant provisions of the Government Code and Water Code. Implementation or termination of a conservation stage level will be determined, in part, by the amount of imported water available from CMWD and MWD.

Advancement or withdrawal to any water conservation stage will not be limited to any particular order, and will be based on the current drought situation and the target goal applicable to that situation. Water conservation stages may be advanced or withdrawn for numerous reasons including:

a. Advancement to subsequent stage:
   i. Emergency condition, such as failure of pumping equipment, etc., that requires a percentage of water consumption reduction greater

than that of the current stage.

ii. Regulatory action that requires more than that stage's percentage reduction in water consumption.
iii. Failure to maintain target water consumption reduction goal of that particular stage.

b. Withdrawal to previous stage:
   i. Emergency condition has been decreased in severity or resolved, so that the previous target goal may be utilized.
   ii. Regulatory action has been resolved or modified.
   iii. Water consumption reductions have been above that necessary to meet target goals of the current stage.

Declaration and Notification of Water Conservation Stage: The existence of conditions requiring the declaration of a water conservation stage will be declared by a resolution of the City Council adopted at a regular or special public meeting held in accordance with State law. The mandatory conservation requirements applicable to Stages 1 through 4 conditions will take effect on the tenth day after the date the stage level is declared. Within five (5) days following the declaration of the stage level, the City will publish a copy of the resolution in a newspaper used for publication of official notices and post a copy on the City's website. If the City activates a water allocation process, it must provide notice of the activation by including it in the regular billing statement or by any other mailing to the address to which the City customarily mails the billing statement for fees or charges for on-going water service. A water allocation will be effective on the fifth day following the date of mailing or at such later date as specified in the notice.

Monitoring Mechanisms: The Water Superintendent will keep the Public Works Director apprised of any conditions that might diminish the City's water supply or increase customer demand. The Public Works Director, based upon information furnished by the Water Superintendent, will make recommendations to the City Manager about the advancement, withdrawal, or termination of water conservation levels and will provide reports on water supply and demand status as required. At a minimum, a "Water Conservation Report" will be made available to the City Manager and City Council on a monthly basis.

<u>Conservation Measures:</u> City water customers and users will be required to comply with the applicable water conservation measures of the stage in effect. The details regarding such measures are found in Sections14.12.030 (Permanent Water Conservation Measures) and 14.12.040 (Additional Water Conservation Measures) of the City's Water Conservation Ordinance – Municipal Code Chapter 14.12. Table 4-3 provides an overview of the conservation measures for each stage level.

<u>Table 4-3: Overview of Water Conservation Measures and Strategies</u>

Measures	Permanent	Stage 1	Stage 2	Stage 3	Stage 4
Demand Reduction Goal	–	15%	30%	40%	50%
Public Outreach	Occasional	Moderate	Concentrated	Concentrated	Concentrated
Enforcement	Passive	Moderate	Concentrated	Concentrated	Concentrated
Landscape Watering Restrictions	8 Am To 6 Pm	4 Days/Wk 8 am to 6 pm	3 Days/Wk 8 am to 6 pm	2 Days/Wk 8 am to 6 pm	No Outdoor Watering
Fix Leaks	72 Hours	72 Hours	48 Hours	48 Hours	24 Hours
Limits On Filling Ponds Or Lakes	No Restrictions	No Restrictions	Only To Sustain Aquatic Life	Only To Sustain Aquatic Life	Only To Sustain Aquatic Life
Vehicle Washing	Positive Shut-Off Nozzle Required	Positive Shut-Off Nozzle Required	Positive Shut-Off Nozzle Required	Positive Shut-Off Nozzle Required	Commercial Car Wash Only
Limits On Filling Pools & Spas	No Restrictions	No Restrictions	Topping Off 1-ft. only & Filling With Valid Permit Only	Topping Off 1-ft. only & Filling With Valid Permit Only	Topping Off 1-ft. Only & No Filling
New Water Services & Limited Building Permits	No Restrictions	Water Impact Study	Water Impact Study	Water Impact Study	No New Permits Where New Service Is Required
Ag Irrigation	No Restrictions	No Restrictions	3 Days Per Week	No Irrigation	No Irrigation

Construction Water	No Restrictions	No Restrictions	Limited Availability	Limited Availability	Limited Availability
Water Runoff	No Runoff Permitted	No Runoff Permitted	No Runoff Permitted	No Runoff Permitted	No Runoff Permitted
Washing Hard Surfaces	Not Permitted	Not Permitted	Not Permitted	Not Permitted	Not Permitted
Ornamental Fountains	Water Must Re-Circulate	Water Must Re-Circulate	Water Must Re-Circulate	Not Permitted	Not Permitted
Single Pass Cooling Systems	Required On New Applications	Required On New Applications	Required On New Applications	Required	Required
Restaurants Serving Water	By Request Only	By Request Only	By Request Only	By Request Only	By Request Only

Penalties and Violations: Violations of the applicable water conservation measures in effect may result in criminal misdemeanor charges or civil penalties, including fines, the installation of water flow restrictors, or the termination of service, in addition to other available remedies.

LIST OF APPENDICES

URGENCY ORDINANCE NO. 1039

AN URGENCY ORDINANCE OF THE CITY COUNCIL OF THE CITY OF CAMARILLO, CALIFORNIA, AMENDING AND RESTATING CHAPTER 14.12 OF THE CAMARILLO MUNICIPAL CODE PERTAINING TO WATER CONSERVATION MEASURES

The City Council of the City of Camarillo ordains as follows:

SECTION 1: The City Council of the City of Camarillo finds as follows:

A. The Urban Water Management Planning Act (Water Code section 10610 et seq. - the "Act") requires that every urban supplier of water for municipal purposes prepare an Urban Water Management Plan, the primary objective of which is to plan for the conservation and efficient use of water.

B. Section 10632 of the Act also requires urban suppliers of water to prepare a Water Shortage Contingency Plan.

C. California Water Code section 375 authorizes water suppliers to adopt and enforce a comprehensive water conservation program to reduce water consumption and conserve supplies.

D. The City has adopted an Urban Water Management Plan, which incorporates a Water Shortage Contingency Plan.

E. The purpose and intent of Municipal Code Chapter 14.12 is to provide a comprehensive water conservation program to reduce water consumption and conserve supplies in a manner consistent with the referenced provisions of the California Water Code.

F. Chapter 14.12 was originally adopted by the City in 1990. Since that time, the City's population has grown significantly and demand has begun to outpace supplies as a result of drought conditions, overdraft conditions with local aquifers and the reduction in ground water pumping allocations, as well as actual and anticipated reductions in the amount of water available for purchase from wholesalers such as the Calleguas Municipal Water District.

G. As of July 1, 2009, the Calleguas Municipal Water District has begun to implement a Water Supply Allocation Program that reduces water supplies to the City by 15 percent.

H. The City Council desires to adopt revised and additional water conservation measures in Chapter 14.12 to further reduce water demand.

I. In order to ensure a sufficient supply of water for the City's customers and to protect the public health, safety, and general welfare, it is necessary that this ordinance be adopted as an urgency ordinance and that the ordinance take effect immediately upon its adoption.

J. The City has noticed and held a public hearing on this ordinance in the manner required by Water Code section 375.

SECTION 2: Amendment to Chapter 14.12. Chapter 14.12 of the Camarillo Municipal Code is amended and restated to read as follows:

"Chapter 14.12

WATER CONSERVATION MEASURES

14.12.010 Definitions.

The following words and phrases whenever used in this chapter have the meaning defined in this section:

"Irrigation system" means an irrigation system with pipes, hoses, spray heads, or sprinkling devices that are operated by hand or through an automated system.

"Potable water" means water that is suitable for drinking.

"Recycled water" means the reclamation and reuse of non-potable water for beneficial use as defined in Title 22 of the California Code of Regulations.

"Single pass cooling systems" means equipment where water is circulated only once to cool equipment before being disposed.

"Water conservation administrator" means the person designated by the city manager to administer the provisions of this chapter or the administrator's designee.

14.12.020 Applicability.

The provisions of this chapter apply to any person in the use of water provided by the city.

14.12.030 Permanent water conservation measures.

The following water conservation measures are in effect at all times:

A. Watering Hours and Duration. Except for testing an irrigation system for a reasonable period of time, watering is prohibited between the hours of 8 a.m. and 6 p.m., and irrigation systems are limited to no more than 15 minutes of watering per day per station. These restrictions do not apply to the use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off nozzle or device, an irrigation system that uses stream rotor sprinklers that meet a 70% efficiency standard, to very low-flow drip type irrigation systems where no emitter produces more than two gallons of water per hour, or to commercial nurseries and growers. In addition, irrigation for the purpose of installing and germinating new lawns or landscaping is exempt from these restrictions for a period not to exceed three weeks, unless the Water Conservation administrator gives written permission to a water user for an extension beyond three weeks due to a longer installation and germination period.

B. Excessive Water Flow or Runoff. Watering in a manner that results in overspray or excessive runoff onto paved or hardscaped areas is prohibited.

C. Washing Hard or Paved Surfaces. Washing of hard or paved surfaces, including sidewalks, walkways, driveways, parking areas, tennis courts, patios or alleys, is prohibited except when necessary to alleviate safety or sanitary hazards or as surface preparation for the application of any architectural coating or painting. All such permitted washing must be done by use of a hand-held bucket or similar container, a hand-held hose equipped with a positive self-closing water shut-off device, a low-volume, high-pressure cleaning machine, or a low-volume high-pressure water broom.

D. Obligation to Fix Leaks. Leaks in distribution, irrigation, or plumbing systems must be promptly corrected after discovery, and in no event more than 72 hours after receiving notice from the city.

E. Water Fountains and Decorative Water Features. Water fountains and decorative water features must have a water recirculation system.

F. Limits on Washing Vehicles. Washing any automobile, truck, van, bus, motorcycle, boat or any other vehicle is restricted to the use of a hand-held bucket or similar container or a hand-held hose equipped with a positive self-closing water shut-off nozzle or device. This provision does not apply to a commercial car washing facility.

G. Drinking Water Served Upon Request. Eating or drinking establishments, including restaurants, hotels, cafés, cafeterias, bars, or other public places where food or drinks are sold are prohibited from providing drinking water to any customer unless expressly requested.

H. Commercial Lodging Establishment Daily Linen Services. Hotels, motels, and other commercial lodging establishments must provide customers the option of not having towels and linen laundered daily. Commercial lodging establishments must prominently display notice of this option in each guest room.

I. Single Pass Cooling Systems. The installation of single pass cooling systems is prohibited in buildings requesting new water service.

J. Restaurants Required to Use Water Conserving Spray Valves. Food service establishments, such as restaurants and cafés, must utilize water conserving nozzles on pre-rinse spray valves.

K. Commercial Car Wash Facilities. Commercial car was facilities may not use or permit the use of any water to wash any car, truck, boat, trailer, bus, recreation vehicle, camper, or any other vehicle, or any portion thereof, except by the following methods:

1. Use of mechanical automatic car wash facilities utilizing water recycling equipment; or

2. Use of a bucket and hand washing; or

3. Use of a hose equipped with an automatic positive self-closing valve that requires the person using the hose to apply and maintain pressure at the outlet end of the hose to activate and maintain the flow of water.

14.12.040 Additional water conservation measures.

The following additional water conservation measures apply upon the effective date of the city council's establishment of the relevant water supply condition stage.

A. Stage 1 (Water Supply Alert - 15% Reduction Goal). The following additional water conservation requirements apply during a declared stage 1 water supply condition:

1. Watering Days. Watering is limited to four days per week and is restricted to Monday, Wednesday, Friday, and Sunday. (The exemptions set forth in Section 14.12.030(A) also apply to this provision.)

2. New Potable Water Service Impact Study. Applicants for new potable water service must prepare a water impact study. In order for such new service to be approved, the water impact study must demonstrate that the proposed project will not create additional demand on the city's water system. An example of such non-impact would be if the proposed project does not require an increase in water usage from that historically used on the same site.

B. Stage 2 (Water Supply Shortage - 30% Reduction Goal). In addition to the restricted uses of water in subsection (A), the following water conservation requirements apply during a declared stage 2 water supply condition:

1. Watering Days. Watering is limited to three days per week. Watering days will be determined by the last number of the account address. Addresses ending with an even number will be permitted to water on Tuesday, Thursday and Saturday only. Addresses ending with an odd number will be permitted to water on Monday, Wednesday and Friday only. (The exemptions set forth in Section 14.12.030(A) also apply to this provision.)

2. Obligation to Fix Leaks. Leaks in distribution, irrigation, or plumbing systems must be promptly corrected after discovery, and in no event more than 48 hours after receiving notice from the city unless other arrangements are made with the city.

3. Limits on Filling Ornamental Lakes or Ponds. Filling or refilling ornamental lakes or ponds is prohibited, except to the extent needed to sustain aquatic life, provided that such aquatic life is of significant value and have been actively managed within the water feature prior to declaration of the stage 2 condition.

4. Limits on Filling Residential Swimming Pools and Spas. Refilling of more than one foot and initial filling of residential swimming pools or outdoor spas is prohibited. In such cases where a valid, unexpired building permit has been issued for the construction of a pool or spa prior to the declaration of a stage 2 condition, filling the pool will be permitted. Verification of a valid permit must be provided to the water conservation administrator prior to filling the pool.

5. Agricultural Irrigation: Agricultural water deliveries will be reduced to three days per week. Irrigation days will be on Monday, Wednesday and Friday only.

6. Construction Water. Reclaimed water must be used if available.

C. Stage 3 (Critical Water Supply Shortage - 40% Reduction Goal). In addition to the restricted uses of water in subsections (A) and (B), the following water conservation requirements apply during a declared stage 3 water supply condition:

1. Watering. Watering is limited to two days per week. Watering days will be determined by the last number of the account address. Addresses ending with an even number will be permitted to water on Tuesday and Friday only. Addresses ending with an odd number will be permitted to water on Monday and Thursday only. (The exemptions set forth in Section 14.12.040(A) also apply to this provision.)

2. Agricultural Irrigation. Irrigation for commercial nurseries and growers is not permitted unless the city determines that recycled water is available and can be applied to the use.

D. Stage 4 (Severe Water Supply Shortage - 50% Reduction Goal). In addition to the restricted uses of water under subsections (A) through (C), the following additional water conservation requirements apply during a declared stage 4 water supply condition:

1. Watering. Watering with potable water is prohibited. If the city determines that recycled water is available, it may be applied for the following uses:

(a) Maintenance of vegetation, including trees and shrubs (but excluding turf), that is watered using a hand-held bucket or similar container, hand-held hose equipped with a positive self-closing water shut-off nozzle or device.

(b) Maintenance of existing landscape necessary for fire protection.

(c) Maintenance of existing landscape for soil erosion control.

(d) Maintenance of plant materials identified to be rare or essential to the well-being of protected species.

(e) Maintenance of landscaped areas within active public parks and playing fields, day care centers, golf course greens, and school grounds, provided that such irrigation does not exceed two days per week according to the schedule and times established in Section 14.12.030(A).

(f) Actively irrigated environmental mitigation projects.

2. Obligation to Fix Leaks. Leaks in distribution, irrigation, or plumbing systems must be promptly corrected after discovery, and in no event more than 24 hours after receiving notice from the city unless other arrangements are made with the city.

3. Limits on Washing Vehicles. Washing any automobile, truck, van, bus, motorcycle, boat, or any other vehicle is prohibited except by use of a commercial car wash facility.

4. Limits on Filling Residential Swimming Pools and Spas. Refilling of more than one foot and initial filling of residential swimming pools or outdoor spas with potable water is prohibited.

5. No New Potable Water Service: No new potable water service will be provided, no new temporary meters or permanent meters will be provided, and no statements of immediate ability to serve or provide potable water service (such as will-serve letters, certificates, or letters of availability) will be issued, except under the following circumstances:

(a) A valid, unexpired building permit has been issued for the project; or

(b) The project is necessary to protect the public health, safety, and welfare; or

(c) The applicant provides substantial evidence of an enforceable commitment that water demands for the project will be offset prior to the provision of a new water meter to the satisfaction of the city.

This provision does not preclude the resetting or turn-on of meters to provide continuation of water service or the restoration of service that has been interrupted for a period of one year or less.

6. Limits on Building Permits. The city will withhold the issuance of any building permit that requires new or expanded water service, except to protect the public health, safety and welfare, or in situations that satisfy the city's adopted water conservation offset requirements.

7. No New Annexations. The city will suspend consideration of annexations to its service area. This provision does not apply to boundary corrections and annexations that will not result in any increased use of water.

14.12.050 Penalties.

A. Penalties. In addition to any other penalties or remedies provided by this code, the following civil fines and penalties may be assessed for any violation of the same nature and of this chapter and made payable as part of the applicable customer's water bill.

1. First Violation. The city will issue a written warning for a first violation and provide a copy of this chapter by mail.

2. Second Violation. A second violation within the 12 calendar months following the first violation is punishable by a fine not to exceed $100.

3. Third Violation. A third violation within the 12 calendar months following the first violation is punishable by a fine not to exceed $500.

4. Fourth and Subsequent Violations. A fourth and any subsequent violation need not be within the 12 calendar months of the first violation, and is punishable by a fine not to exceed $1,000.

5. Water Flow Restrictor. In addition to the fines for the fourth and subsequent violations, the city will install a flow restriction device of 1 GPM capacity for services, for a period of at least 48 hours, up to one and one-half inch size, and comparatively sized restrictions for larger services, on the service of the customer at the premises at which the violation occurred. A charge for installing and removing such flow restricting device will be assessed based on the actual cost.

6. Termination of Service.

(a) The city may disconnect a customer's water service for willful violations of this chapter.

(b) When water service is disconnected, it will only be reconnected upon:

1. Proof of correction of the condition or activity; and

2. Payment of the estimated reconnection charge, including the cost of any inspection fees or staff time.

B. Notice. The city will provide notice of each violation to both the customer's billing address and the service address by regular mail. For purposes of this section, notice will be deemed served 72 hours after deposit in the United States mail. All notices will contain, in addition to the facts of the violation, a statement of the possible penalties for each violation, a statement of the right to appeal the penalty, a brief summary of the appeal process, and if the penalty is termination of service, the date and time termination will occur.

14.12.060 Administrative review and appeals of penalties.

A. Administrative Review Procedure.

1. Persons may request an administrative review of any penalty imposed under this chapter within 10 days of the issuance of the notice of violation. This request must be made in writing to the city clerk and set forth with particularity the reasons the person believes a violation did not occur or that the person was not responsible for the violation and contain the address to which the conclusions of the city's review should be mailed. A request for an administrative review is a mandatory prerequisite to a request for an administrative hearing. Penalties, including termination of water service, will be stayed until such review is conducted and a written decision is made by the water conservation administrator.

2. Upon receiving a request for an administrative review, the water conservation administrator will review the request and within 10 business days provide the person with a written determination as to whether the penalty was properly assessed.

3. The administrator must mail a copy of the notification to the person at the address on the request for administrative review along with notice establishing the penalty date and the procedure for requesting an appeal hearing.

B. Appeal Hearing Procedure.

1. Any person dissatisfied with the conclusion of the initial administrative review may contest the penalty by requesting an administrative appeal hearing. A person must file a request for an administrative appeal hearing with the city clerk within 10 days after the date the city served the person with notice of the administrative review decision. The request must be accompanied by the appeal hearing fee, if any, established by city council resolution. Pending receipt of a written appeal or pending a hearing pursuant to an appeal, the city may take appropriate steps to prevent any

further unauthorized use of water as appropriate to the nature and extent of the alleged violations and the current declared water supply condition.

2. The appeal hearing will be scheduled to occur within a reasonable period of time following the receipt of the request for a hearing not to exceed 15 business days unless consented to by the appellant.

3. The appellant may present any evidence that would tend to show that the alleged violation did not occur. Formal rules of evidence will not apply and all relevant evidence will be admissible, unless a sound objection warrants its exclusion by the city hearing officer designated by the city manager. The decision of the hearing officer will be final and conveyed in writing to the appellant within five business days of the hearing."

SECTION 3: Penalties. In accordance with Camarillo Municipal Code Chapter 1.08, in addition to the availability of all other remedies and penalties provided in that chapter for code violations, a violation of the provisions of Section 11.20.110, if charged criminally, will be a misdemeanor.

SECTION 4: Environmental Review. Under Section 10652 of the Urban Water Management Planning Act (Water Code section 10610 et seq.), the California Environmental Quality Act ("CEQA") does not apply to the preparation and adoption of a Water Shortage Contingency Plan or to the implementation of actions taken pursuant to such plans. Because this ordinance is adopted pursuant to and incorporated as part of the City's Water Shortage Contingency Plan, no CEQA review is required.

SECTION 5. Severability. If any section, subsection, sentence, clause, or phrase of this ordinance is for any reason held to be invalid or unconstitutional by a decision of any court of competent jurisdiction, such decision will not affect the validity of the remaining portions of this ordinance. The City Council hereby declares that it would have passed this ordinance and each and every section, subsection, sentence, clause, or phrase not declared invalid or unconstitutional without regard to whether any portion of the ordinance would be subsequently declared invalid or unconstitutional.

SECTION 6. Publication. The City Clerk is directed to cause this ordinance to be published in the manner required by law

PASSED, APPROVED, AND ADOPTED July 22, 2009.

Mayor

ATTEST:

City Clerk

APPROVED AS TO FORM:

for Donald M. Davis, Assistant City Attorney

I, Jeffrie Madland, City Clerk of the City of Camarillo, certify Urgency Ordinance No. 1039 was introduced and adopted by the Camarillo City Council at its meeting held July 22, 2009, by the following vote:

AYES: Councilmembers: Craven, Kildee, Morgan, Mayor Waunch
NOES: Councilmembers: McDonald
ABSENT: Councilmembers: None

Jamadland
City Clerk

c: Department of Public Works

APPENDIX F
BMP ACTIVITY REPORTS 2005-2010

In later versions of this report, this Appendix will include the BMP Reports for years 2005 through 2010

This Page Left Blank Intentionally

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Based on your signed MOU date, 05/05/1991, your Agency STRATEGY DUE DATE is no later than:	10/22/1993
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991

B. Water Survey Data

Survey Counts	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	19	0
2. Number of surveys completed:	0	0
Indoor Survey:	**SF Accounts**	**MF Units**
3. Check for leaks, including toilets, faucets and meter checks	● Yes ○ No	● Yes ○ No
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	● Yes ○ No	● Yes ○ No
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	● Yes ○ No	● Yes ○ No

Outdoor Survey:		SF Accounts	MF Units
	6. Check irrigation system and timers	● Yes ○ No	● Yes ○ No
	7. Review or develop customer irrigation schedule	● Yes ○ No	● Yes ○ No
	8. Measure landscaped area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	9. Measure total irrigable area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	10. Which measurement method is typically used (Recommended but not required for surveys)	○ Image-Based ○ Measuring Tape ○ Odometer Wheel ○ Pacing ○ Other ● None	
	11. Were customers provided with information packets that included evaluation results and water savings recommendations?	● Yes ○ No	● Yes ○ No
	12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	● Yes ○ No	● Yes ○ No
	a. If yes, in what form are surveys tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None	
	b. Describe how your agency tracks this information. The City of Camarillo offers all residents free Home Water Surveys. The number of surveys completed and tabulated are entered on a spreadsheet. The survey costs are based on an average amount of time spent at any one residence.		

C. Water Survey Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

	1. Based on your signed MOU date, 05/05/1991, your Agency STRATEGY DUE DATE is no later than:	10/22/1993
	2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	● Yes ○ No
	a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991
	3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	● Yes ○ No
	a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991

B. Water Survey Data

Survey Counts	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	63	0
2. Number of surveys completed:	0	0
Indoor Survey:	**SF Accounts**	**MF Units**
3. Check for leaks, including toilets, faucets and meter checks	● Yes ○ No	● Yes ○ No
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	● Yes ○ No	● Yes ○ No
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	● Yes ○ No	● Yes ○ No

Outdoor Survey:		SF Accounts	MF Units
	6. Check irrigation system and timers	● Yes ○ No	● Yes ○ No
	7. Review or develop customer irrigation schedule	● Yes ○ No	● Yes ○ No
	8. Measure landscaped area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	9. Measure total irrigable area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	10. Which measurement method is typically used (Recommended but not required for surveys)	○ Image-Based ○ Measuring Tape ○ Odometer Wheel ○ Pacing ○ Other ● None	
	11. Were customers provided with information packets that included evaluation results and water savings recommendations?	● Yes ○ No	● Yes ○ No
	12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	● Yes ○ No	● Yes ○ No
	a. If yes, in what form are surveys tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None	
	b. Describe how your agency tracks this information. The City of Camarillo offers all residents free Home Water Surveys. The number of surveys completed and tabulated are entered on a spreadsheet. The survey costs are based on an average amount of time spent at any one residence.		

C. Water Survey Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Based on your signed MOU date, 05/05/1991, your Agency STRATEGY DUE DATE is no later than:	10/22/1993
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991

B. Water Survey Data

Survey Counts	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	11256	248
2. Number of surveys completed:	0	0
Indoor Survey:	**SF Accounts**	**MF Units**
3. Check for leaks, including toilets, faucets and meter checks	● Yes ○ No	● Yes ○ No
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	● Yes ○ No	● Yes ○ No
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	● Yes ○ No	● Yes ○ No

Outdoor Survey:	SF Accounts	MF Units
6. Check irrigation system and timers	● Yes ○ No	● Yes ○ No
7. Review or develop customer irrigation schedule	● Yes ○ No	● Yes ○ No
8. Measure landscaped area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
9. Measure total irrigable area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
10. Which measurement method is typically used (Recommended but not required for surveys)	○ Image-Based ○ Measuring Tape ○ Odometer Wheel ○ Pacing ○ Other ● None	
11. Were customers provided with information packets that included evaluation results and water savings recommendations?	● Yes ○ No	● Yes ○ No
12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	● Yes ○ No	● Yes ○ No
a. If yes, in what form are surveys tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None	

b. Describe how your agency tracks this information.

The City of Camarillo offers all residents free Home Water Surveys. The number of surveys completed and tabulated are entered on a spreadsheet. The survey costs are based on an average amount of time spent at any one residence.

C. Water Survey Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

The City of Camarillo offers home water surveys through the City Scene publication, annual Water Quality Reports, and the new customer orientation package; however, it is ultimately up to the homeowners to take advantage of the program.

BMP 01: Water Survey Programs for Single-Family and Multi-Family Residential Customers

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1. Based on your signed MOU date, 05/05/1991, your Agency STRATEGY DUE DATE is no later than:	10/22/1993
2. Has your agency developed and implemented a targeting/ marketing strategy for SINGLE-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991
3. Has your agency developed and implemented a targeting/ marketing strategy for MULTI-FAMILY residential water use surveys?	● Yes ○ No
a. If YES, when was it implemented? (Enter 4-digit year mm/dd/yyyy)	11/1/1991

B. Water Survey Data

Survey Counts	Single Family Accounts	Multi-Family Units
1. Number of surveys offered:	11274	257
2. Number of surveys completed:	0	0
Indoor Survey:	**SF Accounts**	**MF Units**
3. Check for leaks, including toilets, faucets and meter checks	● Yes ○ No	● Yes ○ No
4. Check showerhead flow rates, aerator flow rates, and offer to replace or recommend replacement, if necessary	● Yes ○ No	● Yes ○ No
5. Check toilet flow rates and offer to install or recommend installation of displacement device or direct customer to ULFT replacement program, as neccesary; replace leaking toilet flapper, as necessary	● Yes ○ No	● Yes ○ No

Outdoor Survey:		SF Accounts	MF Units
	6. Check irrigation system and timers	● Yes ○ No	● Yes ○ No
	7. Review or develop customer irrigation schedule	● Yes ○ No	● Yes ○ No
	8. Measure landscaped area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	9. Measure total irrigable area (Recommended but not required for surveys)	○ Yes ● No	○ Yes ● No
	10. Which measurement method is typically used (Recommended but not required for surveys)	○ Image-Based ○ Measuring Tape ○ Odometer Wheel ○ Pacing ○ Other ● None	
	11. Were customers provided with information packets that included evaluation results and water savings recommendations?	● Yes ○ No	● Yes ○ No
	12. Have the number of surveys offered and completed, survey results, and survey costs been tracked?	● Yes ○ No	● Yes ○ No
	a. If yes, in what form are surveys tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None	
	b. Describe how your agency tracks this information. The City of Camarillo offers all residents free Home Water Surveys. The number of surveys completed and tabulated are entered on a spreadsheet. The survey costs are based on an average amount of time spent at any one residence.		

C. Water Survey Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

The City of Camarillo offers home water surveys through the City Scene publication, annual Water Quality Reports, and the new customer orientation package; however, it is ultimately up to the homeowners to take advantage of the program.

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	○ Yes ● No
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	○ Yes ● No
3. Estimated percent of single-family households with low-flow showerheads:	56 %
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	○ Yes ● No
5. Estimated percent of multi-family households with low-flow showerheads:	20 %
6.a. If YES to 2 OR 4 above, did your survey methodology fully comply with the requirements of BMP 2?	○ Yes ○ No
b. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

	1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?	● Yes ○ No
	a. If YES, when did your agency begin implementing this strategy? (Use four-digit year, mm/dd/yyyy)	11/1/1991
	b. Common targeting/ marketing methods. ☐ Bill Messages ☐ Direct Mail to Residents ☐ PSAs ☐ Bill Stuffer ☐ Door-to-Door ☐ Telemarketing ☐ Direct Mail to Owners ☒ Other	
	c. Describe your targeting/ marketing strategy. The City of Camarillo provides flyers to all new customers and customers changing accounts that advertise free services provided related to water conservation. We provide water conservation tips and materials which include low flow showerheads. The flyer also states that free Home Water Surverys are available which include the installation of low flow showerheads.	

	Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
	2. Number of low-flow showerheads distributed:	22	6
	3. Number of toilet-displacement devices distributed:	0	0
	4. Number of toilet flappers distributed:	0	0
	5. Number of faucet aerators distributed:	0	0

	6. Does your agency track the distribution and cost of low-flow devices?	● Yes ○ No
	a. If YES, in what format are low-flow devices tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None
	b. If yes, describe your tracking and distribution system : The number of showerheads distributed is tabulated monthly. Totals are entered on a spreadsheet.	

C. Low-Flow Device Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		

	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	○ Yes ● No
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	○ Yes ● No
3. Estimated percent of single-family households with low-flow showerheads:	56 %
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	○ Yes ● No
5. Estimated percent of multi-family households with low-flow showerheads:	20 %
6.a. If YES to 2 OR 4 above, did your survey methodology fully comply with the requirements of BMP 2?	○ Yes ○ No
b. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?

- (●) Yes
- ( ) No

a. If YES, when did your agency begin implementing this strategy? (Use four-digit year, mm/dd/yyyy)

11/1/1991

b. Common targeting/ marketing methods.

- [ ] Bill Messages
- [ ] Bill Stuffer
- [ ] Direct Mail to Owners
- [ ] Direct Mail to Residents
- [ ] Door-to-Door
- [x] Other
- [ ] PSAs
- [ ] Telemarketing

c. Describe your targeting/ marketing strategy.

The City of Camarillo provides flyers to all new customers and customers changing accounts that advertise free services provided related to water conservation. We provide water conservation tips and materials which include low flow showerheads. The flyer also states that free Home Water Surverys are available which include the installation of low flow showerheads

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	0	0
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	0	0

6. Does your agency track the distribution and cost of low-flow devices?

- (●) Yes
- ( ) No

a. If YES, in what format are low-flow devices tracked?

- ( ) Database
- (●) Spreadsheet
- ( ) Manual Activity
- ( ) None

b. If yes, describe your tracking and distribution system :

The number of showerheads distributed is tabulated monthly. Totals are entered on a spreadsheet.

C. Low-Flow Device Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		

	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	○ Yes ● No
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	○ Yes ● No
3. Estimated percent of single-family households with low-flow showerheads:	58 %
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	○ Yes ● No
5. Estimated percent of multi-family households with low-flow showerheads:	30 %
6.a. If YES to 2 OR 4 above, did your survey methodology fully comply with the requirements of BMP 2?	○ Yes ● No
b. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?		● Yes ○ No
a. If YES, when did your agency begin implementing this strategy? (Use four-digit year, mm/dd/yyyy)		11/1/1991

b. Common targeting/ marketing methods.

☐ Bill Messages	☐ Direct Mail to Residents	☐ PSAs
☒ Bill Stuffer	☐ Door-to-Door	☐ Telemarketing
☐ Direct Mail to Owners	☒ Other	

c. Describe your targeting/ marketing strategy.

The City of Camarillo provides flyers to all new customers and customers changing accounts that advertise free services provided related to water conservation. We provide water conservation tips and materials which include low flow showerheads. The flyer also states that free Home Water Surveys are available which include the installation of low flow showerheads.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	235	29
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	0	0

6. Does your agency track the distribution and cost of low-flow devices?	● Yes ○ No
a. If YES, in what format are low-flow devices tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None

b. If yes, describe your tracking and distribution system :

The number of shower heads distributed is tabulated monthly. Totals are entered on a spreadsheet.

C. Low-Flow Device Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		

	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

Low flow showerheads were distributed with each toilet as part of the ULFT/HET CBO program.

BMP 02: Residential Plumbing Retrofit

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1. Is there an enforceable ordinance in effect in your service area requiring replacement of high-flow showerheads and other water use fixtures with their low-flow counterparts?	○ Yes ● No
a. If YES, list local jurisdictions in your service area and code or ordinance in each:	
2. Has your agency satisfied the 75% saturation requirement for single-family housing units?	○ Yes ● No
3. Estimated percent of single-family households with low-flow showerheads:	58 %
4. Has your agency satisfied the 75% saturation requirement for multi-family housing units?	○ Yes ● No
5. Estimated percent of multi-family households with low-flow showerheads:	30 %
6.a. If YES to 2 OR 4 above, did your survey methodology fully comply with the requirements of BMP 2?	○ Yes ● No
b. If YES to 2 OR 4 above, please describe how saturation was determined, including the dates and results of any survey research.	

B. Low-Flow Device Distribution Information

1. Has your agency developed a targeting/ marketing strategy for distributing low-flow devices?	● Yes ○ No
a. If YES, when did your agency begin implementing this strategy? (Use four-digit year, mm/dd/yyyy)	11/1/1991

b. Common targeting/ marketing methods.

☐ Bill Messages	☐ Direct Mail to Residents	☐ PSAs
☒ Bill Stuffer	☐ Door-to-Door	☐ Telemarketing
☐ Direct Mail to Owners	☒ Other	

c. Describe your targeting/ marketing strategy.

The City of Camarillo provides flyers to all new customers and customers changing accounts that advertise free services provided related to water conservation. We provide water conservation tips and materials which include low flow showerheads. The flyer also states that free Home Water Surveys are available which include the installation of low flow showerheads.

Low-Flow Devices Distributed/ Installed	SF Accounts	MF Units
2. Number of low-flow showerheads distributed:	15	1
3. Number of toilet-displacement devices distributed:	0	0
4. Number of toilet flappers distributed:	0	0
5. Number of faucet aerators distributed:	0	0

6. Does your agency track the distribution and cost of low-flow devices?	● Yes ○ No
a. If YES, in what format are low-flow devices tracked?	○ Database ● Spreadsheet ○ Manual Activity ○ None

b. If yes, describe your tracking and distribution system :

The number of shower heads distributed is tabulated monthly. Totals are entered on a spreadsheet.

C. Low-Flow Device Program Expenditures

	This Year	Next Year

	1. Budgeted Expenditures		
	2. Actual Expenditures		

D. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

Low flow showerheads were distributed with each toilet as part of the ULFT/HET CBO program.

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Does your agency own or operate a water distribution system?	● Yes ○ No
- IF YOU ANSWERED NO TO #1, YOU ARE DONE WITH THE FORM. **- IF YOU ANSWERED YES TO #1, PLEASE ANSWER THE FOLLOWING QUESTIONS.**	
2. Has your agency completed a pre-screening system audit for this reporting year?	● Yes ○ No
3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	8265.73
b. Determine other system verifiable uses (AF)	0
c. Determine total supply into the system (AF)	8647.2
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	0.956
4. Does your agency keep necessary data on file to verify the values entered in question 3?	● Yes ○ No
5. Did your agency complete a full-scale system water audit during this report year?	○ Yes ● No
6. Does your agency maintain in-house records of audit results or completed AWWA audit worksheets for the completed audit which could be forwarded to CUWCC?	● Yes ○ No
7. Does your agency operate a system leak detection program?	○ Yes ● No

a. If yes, describe the leak detection program:

B. Survey Data

1. Total number of miles of distribution system line:	204.34
2. Number of miles of distribution system line surveyed:	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

	1. Does your agency own or operate a water distribution system?	● Yes ○ No
	- IF YOU ANSWERED NO TO #1, YOU ARE DONE WITH THE FORM. - IF YOU ANSWERED YES TO #1, PLEASE ANSWER THE FOLLOWING QUESTIONS.	
	2. Has your agency completed a pre-screening system audit for this reporting year?	● Yes ○ No
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	8471.28
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	8843.5
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	0.958
	4. Does your agency keep necessary data on file to verify the values entered in question 3?	● Yes ○ No
	5. Did your agency complete a full-scale system water audit during this report year?	○ Yes ● No
	6. Does your agency maintain in-house records of audit results or completed AWWA audit worksheets for the completed audit which could be forwarded to CUWCC?	● Yes ○ No
	7. Does your agency operate a system leak detection program?	○ Yes ● No

a. If yes, describe the leak detection program:

B. Survey Data

1. Total number of miles of distribution system line:	207.34
2. Number of miles of distribution system line surveyed:	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Does your agency own or operate a water distribution system?	● Yes ○ No
- IF YOU ANSWERED NO TO #1, YOU ARE DONE WITH THE FORM. - IF YOU ANSWERED YES TO #1, PLEASE ANSWER THE FOLLOWING QUESTIONS.	
2. Has your agency completed a pre-screening system audit for this reporting year?	● Yes ○ No
3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
a. Determine metered sales (AF)	9850.1
b. Determine other system verifiable uses (AF)	0
c. Determine total supply into the system (AF)	10351.1
d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	0.952
4. Does your agency keep necessary data on file to verify the values entered in question 3?	● Yes ○ No
5. Did your agency complete a full-scale system water audit during this report year?	○ Yes ● No
6. Does your agency maintain in-house records of audit results or completed AWWA audit worksheets for the completed audit which could be forwarded to CUWCC?	● Yes ○ No
7. Does your agency operate a system leak detection program?	○ Yes ● No

a. If yes, describe the leak detection program:

B. Survey Data

1. Total number of miles of distribution system line:	207.5
2. Number of miles of distribution system line surveyed:	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 03: System Water Audits, Leak Detection and Repair

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

	1. Does your agency own or operate a water distribution system?	● Yes ○ No
	- IF YOU ANSWERED NO TO #1, YOU ARE DONE WITH THE FORM. - IF YOU ANSWERED YES TO #1, PLEASE ANSWER THE FOLLOWING QUESTIONS.	
	2. Has your agency completed a pre-screening system audit for this reporting year?	● Yes ○ No
	3. If YES, enter the values (AF/Year) used to calculate verifiable use as a percent of total production:	
	a. Determine metered sales (AF)	10056.6
	b. Determine other system verifiable uses (AF)	0
	c. Determine total supply into the system (AF)	10535.1
	d. Using the numbers above, if (Metered Sales + Other Verifiable Uses) / Total Supply is < 0.9 then a full-scale system audit is required. *(This number will automatically calculate when you Save the Session)*	0.955
	4. Does your agency keep necessary data on file to verify the values entered in question 3?	● Yes ○ No
	5. Did your agency complete a full-scale system water audit during this report year?	○ Yes ● No
	6. Does your agency maintain in-house records of audit results or completed AWWA audit worksheets for the completed audit which could be forwarded to CUWCC?	● Yes ○ No
	7. Does your agency operate a system leak detection program?	○ Yes ● No

a. If yes, describe the leak detection program:

B. Survey Data

1. Total number of miles of distribution system line:	210.4
2. Number of miles of distribution system line surveyed:	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Please fill out the matrix:

Types of Billed Accounts	% Accounts Metered	% Accounts Measured	% Accounts Volumetric Billing
a. Treated Water SF Residential Accounts	100		100
b. Treated Water MF Residential Accounts	100		100
c. Treated Water Commercial Accounts	100		100
d. Treated Water Industrial Accounts	100		100
e. Treated Water Institutional Accounts	100		100
f. Raw Water Residential Deliveries	100	0	100
g. Raw Water Non-Residential Deliveries	100	0	100

2. If your agency does not meter 100% of all treated water accounts:

a. Does your agency have a plan or program for retrofitting existing unmetered treated water connections?	Yes No
b. By what date would 100% of all treated water accounts be metered?	
c. Number of previously unmetered accounts fitted with meters during reporting period:	

3. If your agency does not bill 100% of all **treated** water accounts by volume of use:

a. By what date (Year must be four digits mm/dd/yyyy) will all customers with meters be billed by volume of use	

	4. If your agency does not meter or measure 100% of all **raw** water delivery fields, does your agency intend to develop a program for measuring all raw water deliveries?	○ Yes ○ No
	5. If your agency does not volumetrically bill 100% of all **raw** water delivery, does your agency intend to develop a program for billing all raw water deliveries by volume of use?	○ Yes ○ No
	6. Does your agency meter by volume of use all municipal and governmental accounts?	○ Yes ● No
	a. If no, which types of accounts are not included: ☐ Landscape Irrigation ☐ Municipal Facilities ☐ Airports ☐ Hospitals and Health Care Facilities ☐ Utility Owned Services ☒ Street Sweeping ☒ Fire Flows or Hydrant Uses	
	7. Does your agency bill by volume of use all municipal and governmental accounts?	○ Yes ● No
	a. If no, which types of accounts are not included: ☐ Landscape Irrigation ☐ Municipal Facilities ☐ Airports ☐ Hospitals and Health Care Facilities ☐ Utility Owned Services ☒ Street Sweeping ☒ Fire Flows or Hydrant Uses	

B. Feasibility Study

	1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	○ Yes ● No
	a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
	b. Describe the feasibility study:	

2. Number of CII accounts with mixed-use meters:	15
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Reporting Unit:	BMP Form Status:	Year:
City of Camarillo	**100% Complete**	**2006**

A. Implementation

1. Please fill out the matrix:

Types of Billed Accounts	% Accounts Metered	% Accounts Measured	% Accounts Volumetric Billing
a. Treated Water SF Residential Accounts	100		100
b. Treated Water MF Residential Accounts	100		100
c. Treated Water Commercial Accounts	100		100
d. Treated Water Industrial Accounts	100		100
e. Treated Water Institutional Accounts	100		100
f. Raw Water Residential Deliveries	100	0	100
g. Raw Water Non-Residential Deliveries	100	0	100

2. If your agency does not meter 100% of all treated water accounts:

a. Does your agency have a plan or program for retrofitting existing unmetered treated water connections?	○ Yes ○ No
b. By what date would 100% of all treated water accounts be metered?	
c. Number of previously unmetered accounts fitted with meters during reporting period:	

3. If your agency does not bill 100% of all **treated** water accounts by volume of use:

a. By what date (Year must be four digits mm/dd/yyyy) will all customers with meters be billed by volume of use	

	4. If your agency does not meter or measure 100% of all **raw** water delivery fields, does your agency intend to develop a program for measuring all raw water deliveries?	○ Yes ○ No
	5. If your agency does not volumetrically bill 100% of all **raw** water delivery, does your agency intend to develop a program for billing all raw water deliveries by volume of use?	○ Yes ○ No
	6. Does your agency meter by volume of use all municipal and governmental accounts?	○ Yes ● No
	a. If no, which types of accounts are not included: ☐ Landscape Irrigation ☐ Municipal Facilities ☐ Airports ☐ Hospitals and Health Care Facilities ☐ Utility Owned Services ☒ Street Sweeping ☒ Fire Flows or Hydrant Uses	
	7. Does your agency bill by volume of use all municipal and governmental accounts?	○ Yes ● No
	a. If no, which types of accounts are not included: ☐ Landscape Irrigation ☐ Municipal Facilities ☐ Airports ☐ Hospitals and Health Care Facilities ☐ Utility Owned Services ☒ Street Sweeping ☒ Fire Flows or Hydrant Uses	

B. Feasibility Study

	1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	○ Yes ● No
	a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
	b. Describe the feasibility study:	

2. Number of CII accounts with mixed-use meters:	15
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Does your agency have any unmetered service connections?	○ Yes ● No
a. If YES, has your agency completed a meter retrofit plan?	○ Yes ○ No
b. If YES, number of previously unmetered accounts fitted with meters during report year:	
2. Are all new service connections being metered?	● Yes ○ No
3. Are all new service connections being billed volumetrically with meters?	● Yes ○ No
4. Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair & replace meters?	○ Yes ● No

5. Please fill out the following matrix:

Account Type	# Metered Accounts	# Accounts Read	# Accounts Vol Billing	Billing Frequency	# Vol Estimates
a. Single Family	11256	11256	11256	12	0
b. Multi-Family	248	248	248	12	0
c. Commercial	722	722	722	12	0
d. Industrial	7	7	7	12	0
e. Institutional	66	66	66	12	0
f. Landscape Irrigation	562	562	562	12	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	○ Yes ● No

a. If YES, when was the feasibility study conducted? (mm/dd/yy)

b. Describe the feasibility study:

2. Number of CII accounts with mixed-use meters:	0
3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting year	0

C. "At Least As Effective As"

1. Is your agency implementing an "at least as effective as" variant of this BMP?	Yes / **No** (selected)

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 04: Metering with Commodity Rates for all New Connections and Retrofit of Existing Connections

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1. Does your agency have any unmetered service connections?	○ Yes ● No
a. If YES, has your agency completed a meter retrofit plan?	○ Yes ○ No
b. If YES, number of previously unmetered accounts fitted with meters during report year:	
2. Are all new service connections being metered?	● Yes ○ No
3. Are all new service connections being billed volumetrically with meters?	● Yes ○ No
4. Has your agency completed and submitted electronically to the Council a written plan, policy or program to test, repair & replace meters?	● Yes ○ No

5. Please fill out the following matrix:

Account Type	# Metered Accounts	# Accounts Read	# Accounts Vol Billing	Billing Frequency	# Vol Estimates
a. Single Family	11274	11274	11274	12	0
b. Multi-Family	257	257	257	12	0
c. Commercial	742	742	742	12	0
d. Industrial	7	7	7	12	0
e. Institutional	67	67	67	12	0
f. Landscape Irrigation	573	573	573	12	0

B. Feasibility Study

1. Has your agency conducted a feasibility study to assess the merits of a program to provide incentives to switch mixed-use accounts to dedicated landscape meters?	○ Yes ● No

	a. If YES, when was the feasibility study conducted? (mm/dd/yy)	
	b. Describe the feasibility study:	
	2. Number of CII accounts with mixed-use meters:	0
	3. Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting year	0

C. "At Least As Effective As"

	1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	522
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	25
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	458.9
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	337
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	● Yes ○ No

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	● Yes ○ No
a. If YES, when did your agency begin implementing this strategy? (Year must be four digit mm/dd/yyyy)	11/1/1991
b. Description of marketing / targeting strategy: As staffing allows the City of Camarillo offers surveys to all customers with landscapes over two acres. It is marketed through individual contact, person to person, with the property owner / manager.	
2. Number of Surveys Offered:	0
3. Number of Surveys Completed:	0
4. Indicate which of the following Landscape Elements are part of your survey:	
a. Irrigation System Check	● Yes ○ No
b. Distribution Uniformity Analysis	● Yes ○ No
c. Review / Develop Irrigation Schedules	● Yes ○ No

	d. Measure Landscape Area	● Yes ○ No
	e. Measure Total Irrigable Area	● Yes ○ No
	f. Provide Customer Report / Information	● Yes ○ No
	5. Do you track survey offers and results?	● Yes ○ No
	6. Does your agency provide follow-up surveys for previously completed surveys?	○ Yes ● No
	a. If YES, describe below:	

C. Other BMP 5 Actions

	1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets?	○ Yes ● No
	2. Number of CII mixed-use accounts with landscape budgets.	0
	From BMP 4 report: Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0
	Total number of change-outs from mixed-use to dedicated irrigation meters since Base Year.	0
	3. Do you offer landscape irrigation training?	● Yes ○ No
	4. Does your agency offer financial incentives to improve landscape water use efficiency? If YES, describe below:	● Yes ○ No

	Type of Financial Incentive	Budget (Dollars/ Years)	Number Awarded to Customers	Total Amount Award

	a. Rebates	0	0	0
	b. Loans	0	0	0
	c. Grants	0	0	0

5. Do you provide landscape water use efficiency information to new customers and customers changing services? ● Yes ○ No

a. If YES, describe below:

The City provides all customers signing up for water with a Sunset brochure entitled " Smart Water and Energy Use in the West". Also a flyer is included that explains the City's ordinance prohibiting water waste. The flyer also lists some of the free water conservation services provided by the City.

6. Do you have irrigated landscaping at your facilities? ● Yes ○ No

a. If yes, is it water-efficient? ● Yes ○ No

b. If yes, does it have dedicated irrigation metering? ● Yes ○ No

7. Do you provide customer notices at the start of the irrigation season? ○ Yes ● No

8. Do you provide customer notices at the end of the irrigation season? ○ Yes ● No

D. Landscape Conservation Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

E. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Water Use Budgets

	1. Number of Dedicated Irrigation Meter Accounts:	544
	2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	25
	3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	458.9
	4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	329
	5. Does your agency provide water use notices to accounts with budgets each billing cycle?	○ Yes ● No

B. Landscape Surveys

	1. Has your agency developed a marketing / targeting strategy for landscape surveys?	● Yes ○ No
	a. If YES, when did your agency begin implementing this strategy? (Year must be four digit mm/dd/yyyy)	11/1/1991
	b. Description of marketing / targeting strategy: As staffing allows the City of Camarillo offers surveys to all customers with landscapes over two acres. It is marketed through individual contact, person to person, with the property owner / manager.	
	2. Number of Surveys Offered:	0
	3. Number of Surveys Completed:	0
	4. Indicate which of the following Landscape Elements are part of your survey:	
	a. Irrigation System Check	● Yes ○ No
	b. Distribution Uniformity Analysis	● Yes ○ No
	c. Review / Develop Irrigation Schedules	● Yes ○ No

	d. Measure Landscape Area	● Yes ○ No
	e. Measure Total Irrigable Area	● Yes ○ No
	f. Provide Customer Report / Information	● Yes ○ No
	5. Do you track survey offers and results?	● Yes ○ No
	6. Does your agency provide follow-up surveys for previously completed surveys?	○ Yes ● No
	a. If YES, describe below:	

C. Other BMP 5 Actions

	1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets?	○ Yes ● No
	2. Number of CII mixed-use accounts with landscape budgets.	0
	From BMP 4 report: Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0
	Total number of change-outs from mixed-use to dedicated irrigation meters since Base Year.	0
	3. Do you offer landscape irrigation training?	● Yes ○ No
	4. Does your agency offer financial incentives to improve landscape water use efficiency? If YES, describe below:	● Yes ○ No

	Type of Financial Incentive	Budget (Dollars/ Years)	Number Awarded to Customers	Total Amount Award

	a. Rebates	0	0	0
	b. Loans	0	0	0
	c. Grants	0	0	0

	5. Do you provide landscape water use efficiency information to new customers and customers changing services?	● Yes ○ No
	a. If YES, describe below: The City provides all customers signing up for water with a Sunset brochure entitled " Smart Water and Energy Use in the West". Also a flyer is included that explains the City's ordinance prohibiting water waste. The flyer also lists some of the free water conservation services provided by the City.	
	6. Do you have irrigated landscaping at your facilities?	● Yes ○ No
	a. If yes, is it water-efficient?	● Yes ○ No
	b. If yes, does it have dedicated irrigation metering?	● Yes ○ No
?	7. Do you provide customer notices at the start of the irrigation season?	○ Yes ● No
?	8. Do you provide customer notices at the end of the irrigation season?	○ Yes ● No

D. Landscape Conservation Program Expenditures

		This Year	Next Year
?	1. Budgeted Expenditures		
?	2. Actual Expenditures		

E. "At Least As Effective As"

?	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:
City of Camarillo

BMP Form Status: **100% Complete**

Year: **2007**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	562
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	28
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	471
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	526
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	○ Yes ● No

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	● Yes ○ No
a. If YES, when did your agency begin implementing this strategy? (Year must be four digit mm/dd/yyyy)	11/1/1991
b. Description of marketing / targeting strategy:	

As staffing allows the City of Camarillo offers surveys to all customers with landscapes over two acres. It is marketed through individual contact, person to person, with the property owner / manager.

2. Number of Surveys Offered:	0
3. Number of Surveys Completed:	0
4. Indicate which of the following Landscape Elements are part of your survey:	
a. Irrigation System Check	● Yes ○ No
b. Distribution Uniformity Analysis	● Yes ○ No
c. Review / Develop Irrigation Schedules	● Yes ○ No

	d. Measure Landscape Area	● Yes ○ No
	e. Measure Total Irrigable Area	● Yes ○ No
	f. Provide Customer Report / Information	● Yes ○ No
	5. Do you track survey offers and results?	● Yes ○ No
	6. Does your agency provide follow-up surveys for previously completed surveys?	○ Yes ● No
	a. If YES, describe below:	

C. Other BMP 5 Actions

	1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets?	○ Yes ● No
	2. Number of CII mixed-use accounts with landscape budgets.	0
	From BMP 4 report: Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0
	Total number of change-outs from mixed-use to dedicated irrigation meters since Base Year.	0
	3. Do you offer landscape irrigation training?	● Yes ○ No
	4. Does your agency offer financial incentives to improve landscape water use efficiency? If YES, describe below:	○ Yes ● No

	Type of Financial Incentive	Budget (Dollars/ Years)	Number Awarded to Customers	Total Amount Award

	a. Rebates	0	0	0
	b. Loans	0	0	0
	c. Grants	0	0	0

	5. Do you provide landscape water use efficiency information to new customers and customers changing services?	● Yes ○ No
	a. If YES, describe below: The City provides all customers signing up for water with a Sunset brochure entitled " Smart Water and Energy Use in the West". Also a flyer is included that explains the City's ordinance prohibiting water waste. The flyer also lists some of the free water conservation services provided by the City.	
	6. Do you have irrigated landscaping at your facilities?	● Yes ○ No
	a. If yes, is it water-efficient?	● Yes ○ No
	b. If yes, does it have dedicated irrigation metering?	● Yes ○ No
	7. Do you provide customer notices at the start of the irrigation season?	○ Yes ● No
	8. Do you provide customer notices at the end of the irrigation season?	○ Yes ● No

D. Landscape Conservation Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		
	2. Actual Expenditures		

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 05: Large Landscape Conservation Programs and Incentives

Reporting Unit:
City of Camarillo

BMP Form Status: **100% Complete**

Year: **2008**

A. Water Use Budgets

1. Number of Dedicated Irrigation Meter Accounts:	573
2. Number of Dedicated Irrigation Meter Accounts with Water Budgets:	28
3. Budgeted Use for Irrigation Meter Accounts with Water Budgets (AF):	471
4. Actual Use for Irrigation Meter Accounts with Water Budgets (AF):	653
5. Does your agency provide water use notices to accounts with budgets each billing cycle?	No

B. Landscape Surveys

1. Has your agency developed a marketing / targeting strategy for landscape surveys?	Yes
a. If YES, when did your agency begin implementing this strategy? (Year must be four digit mm/dd/yyyy)	11/1/1991

b. Description of marketing / targeting strategy:

As staffing allows the City of Camarillo offers surveys to all customers with landscapes over two acres. It is marketed through individual contact, person to person, with the property owner / manager.

2. Number of Surveys Offered:	0
3. Number of Surveys Completed:	0

4. Indicate which of the following Landscape Elements are part of your survey:

a. Irrigation System Check	Yes
b. Distribution Uniformity Analysis	Yes
c. Review / Develop Irrigation Schedules	Yes

	d. Measure Landscape Area	● Yes ○ No
	e. Measure Total Irrigable Area	● Yes ○ No
	f. Provide Customer Report / Information	● Yes ○ No
	5. Do you track survey offers and results?	● Yes ○ No
	6. Does your agency provide follow-up surveys for previously completed surveys?	○ Yes ● No
	a. If YES, describe below:	

C. Other BMP 5 Actions

	1. An agency can provide mixed-use accounts with ETo-based landscape budgets in lieu of a large landscape survey program. Does your agency provide mixed-use accounts with landscape budgets?	○ Yes ● No
	2. Number of CII mixed-use accounts with landscape budgets.	0
	From BMP 4 report: Number of CII accounts with mixed-use meters retrofitted with dedicated irrigation meters during reporting period.	0
	Total number of change-outs from mixed-use to dedicated irrigation meters since Base Year.	0
	3. Do you offer landscape irrigation training?	● Yes ○ No
	4. Does your agency offer financial incentives to improve landscape water use efficiency? If YES, describe below:	○ Yes ● No

	Type of Financial Incentive	Budget (Dollars/ Years)	Number Awarded to Customers	Total Amount Award

	a. Rebates	0	0	0
	b. Loans	0	0	0
	c. Grants	0	0	0

	5. Do you provide landscape water use efficiency information to new customers and customers changing services?	● Yes ○ No
	a. If YES, describe below: The City provides all customers signing up for water with a Sunset brochure entitled " Smart Water and Energy Use in the West". Also a flyer is included that explains the City's ordinance prohibiting water waste. The flyer also lists some of the free water conservation services provided by the City.	
	6. Do you have irrigated landscaping at your facilities?	● Yes ○ No
	a. If yes, is it water-efficient?	● Yes ○ No
	b. If yes, does it have dedicated irrigation metering?	● Yes ○ No
	7. Do you provide customer notices at the start of the irrigation season?	○ Yes ● No
	8. Do you provide customer notices at the end of the irrigation season?	○ Yes ● No

D. Landscape Conservation Program Expenditures

		This Year	Next Year
	1. Budgeted Expenditures		
	2. Actual Expenditures		

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2005

A. Coverage Goal

		Single Family	Multi Family
	1. Number of **residential** dwelling units in the agency service area.	10814	3354
	2. Coverage Goal = **14168** Total Dwelling Units x 0.0768		1,088 Pts

B. Implementation

1. Does your agency offer rebates for **residential** high-efficiency washers with water factors of 9.5 or less?

● Yes
○ No

			Total Value ofFinancial Incentives				
	HEW Water Factor	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
	2. Greater than 8.5 but not exceeding 9.5	14	1,050	1,890		2,940	14
	3. Greater than 6.0 but not exceeding 8.5	16	1,200	2,160		3,360	32
	4. Less than or equal to 6.0	35	2,625	4,725		7,350	105
	TOTALS:	65	4,875	8,775		13,650	151

C. Past Credit Points

For incentives issued before July 1, 2004, select ONE of the following options:

Agency earns points based on HEW Water Factor

NOTE: Agency shall not receive credit for any HEW incentives where the agency did not provide a financial incentive of $25 or more.

Method One: Points based on HEW Water Factor

HEW Water Factor	No.of Financial Incentives Issued	Total Value of Financial Incentives: Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
2. Greater than 8.5 but not exceeding 9.5	12		2,520		2,520	12
3. Greater than 6.0 but not exceeding 8.5	57		11,970		11,970	114
4. Less than or equal to 6.0	42		8,820		8,820	126

Method Two: Agency earns 1 point for each HEW

	No. of HEWs	Total Value	Points Awarded
4. Total HEWs installed	111	23,310	111

	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
Past Cr TOTALS:	111		23,310		23,310	252

D. Rebate Program Expenditures

1. Average or Estimated Administration and Overhead	1908
2. Is the financial incentive offered per HEW at least equal to the marginal benefits of the water savings per HEW?	● Yes ○ No

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2006

A. Coverage Goal

		Single Family	Multi Family
	1. Number of **residential** dwelling units in the agency service area.		
	2. Coverage Goal = Total Dwelling Units x 0.0768		1,088 Pts

B. Implementation

1. Does your agency offer rebates for **residential** high-efficiency washers with water factors of 9.5 or less?

● Yes
○ No

		Total Value ofFinancial Incentives				
HEW Water Factor	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
2. Greater than 8.5 but not exceeding 9.5	0	0	0		0	0
3. Greater than 6.0 but not exceeding 8.5	0	0	0		0	0
4. Less than or equal to 6.0	75	5,625	10,125		15,750	225
TOTALS:	75	5,625	10,125		15,750	225

C. Past Credit Points

For incentives issued before July 1, 2004, select ONE of the following options:

NOTE: Agency shall not receive credit for any HEW incentives where the agency did not provide a financial incentive of $25 or more.

Method One: Points based on HEW Water Factor

HEW Water Factor	No.of Financial Incentives Issued	Total Value of Financial Incentives: Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
2. Greater than 8.5 but not exceeding 9.5						
3. Greater than 6.0 but not exceeding 8.5						
4. Less than or equal to 6.0						

Method Two: Agency earns 1 point for each HEW

	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
4. Total HEWs installed	111		23,310			111
Past Cr TOTALS:						252

D. Rebate Program Expenditures

1. Average or Estimated Administration and Overhead	2290
2. Is the financial incentive offered per HEW at least equal to the marginal benefits of the water savings per HEW?	● Yes ○ No

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
City of Camarillo

BMP Form Status: **100% Complete**

Year: **2007**

A. Coverage Goal

		Single Family	Multi Family
	1. Number of **residential** dwelling units in the agency service area.		
	2. Coverage Goal = Total Dwelling Units x 0.0768		1,088 Pts

B. Implementation

1. Does your agency offer rebates for **residential** high-efficiency washers with water factors of 9.5 or less?

● Yes
○ No

			Total Value ofFinancial Incentives				
	HEW Water Factor	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
	2. Greater than 8.5 but not exceeding 9.5	0	0	0	0	0	0
	3. Greater than 6.0 but not exceeding 8.5	0	0	0	0	0	0
	4. Less than or equal to 6.0	75	5,625	10,125	0	15,750	225
	TOTALS:	75	5,625	10,125	0	15,750	225

C. Past Credit Points

For incentives issued before July 1, 2004, select ONE of the following options:

NOTE: Agency shall not receive credit for any HEW incentives where the agency did not provide a financial incentive of $25 or more.

Method One: Points based on HEW Water Factor

HEW Water Factor	No.of Financial Incentives Issued	Total Value of Financial Incentives: Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
2. Greater than 8.5 but not exceeding 9.5						
3. Greater than 6.0 but not exceeding 8.5						
4. Less than or equal to 6.0						

Method Two: Agency earns 1 point for each HEW

	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
4. Total HEWs installed	111		23,310			111
Past Cr TOTALS:						252

D. Rebate Program Expenditures

1. Average or Estimated Administration and Overhead	2000
2. Is the financial incentive offered per HEW at least equal to the marginal benefits of the water savings per HEW?	● Yes ○ No

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 06: High-Efficiency Washing Machine Rebate Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2008

A. Coverage Goal

		Single Family	Multi Family
	1. Number of **residential** dwelling units in the agency service area.		
	2. Coverage Goal = Total Dwelling Units x 0.0768		1,088 Pts

B. Implementation

1. Does your agency offer rebates for **residential** high-efficiency washers with water factors of 9.5 or less?

○ Yes
● No

			Total Value of Financial Incentives				
	HEW Water Factor	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
	2. Greater than 8.5 but not exceeding 9.5	0	0	0	0	0	0
	3. Greater than 6.0 but not exceeding 8.5	0	0	0	0	0	0
	4. Less than or equal to 6.0	0	0	0	0	0	0
	TOTALS:	0	0	0	0	0	0

C. Past Credit Points

For incentives issued before July 1, 2004, select ONE of the following options:

NOTE: Agency shall not receive credit for any HEW incentives where the agency did not provide a financial incentive of $25 or more.

Method One: Points based on HEW Water Factor

HEW Water Factor	No.of Financial Incentives Issued	Total Value of Financial Incentives: Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
2. Greater than 8.5 but not exceeding 9.5						
3. Greater than 6.0 but not exceeding 8.5						
4. Less than or equal to 6.0						

Method Two: Agency earns 1 point for each HEW

	No.of Financial Incentives Issued	Retail Water Agency	Wholesaler/ Grants	Energy Utilities	TOTAL	Points Awarded
4. Total HEWs installed	111		23,310			111
Past Cr TOTALS:						252

D. Rebate Program Expenditures

1. Average or Estimated Administration and Overhead	0
2. Is the financial incentive offered per HEW at least equal to the marginal benefits of the water savings per HEW?	○ Yes ● No

E. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

F. Comments

BMP 07: Public Information Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2005

A. Implementation

1. How is your public information program implemented?

- ○ Wholesaler
- ○ Retailer
- ● Mixed
- ○ None

Wholesaler sponsors: Metropolitan Water District & Calleguas Municipal Water District.

2. Describe the program and how it's organized.

The City of Camarillo publishes a quarterly newsletter in which we publish articles on the topic of water use efficiency. Brochures on water use efficiency are made available year around in the foyer of City Hall. Billing inserts are included in water bills announcing events such as Water Awareness month in May and ULFT and HECW rebate programs. Brochures on water use efficiency and flyers explaining the City's ordinance prohibiting water waste are mailed to all new water service customers. The City of Camarillo's conservation message is also included in the Annual Water Quality Report (Consumer Confidence Report).

3. Indicate which and how many of the following activities are included in your public information program:

Survey Counts	Yes/No	Number of Events
a. Paid Advertising	○ Yes ● No	
b. Public Service Announcement	○ Yes ● No	
c. Bill Inserts / Newsletters / Brochures	● Yes ○ No	5
d. Bill showing water usage in comparison to previous year's usage	● Yes ○ No	
e. Demonstration Gardens	● Yes ○ No	1
f. Special Events, Media Events	● Yes ○ No	1
g. Speaker's Bureau	○ Yes ● No	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	○ Yes ● No	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures	12679.62	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 07: Public Information Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2006

A. Implementation

1. How is your public information program implemented?

○ Wholesaler ○ Retailer
● Mixed ○ None

Wholesaler sponsors: Calleguas Municipal Water District

2. Describe the program and how it's organized.

The City of Camarillo publishes a quarterly newsletter in which we publish articles on the topic of water use efficiency. Brochures on water use efficiency are made available year around in the foyer of City Hall. Billing inserts are included in water bills announcing events such as Water Awareness month in May and ULFT and HECW rebate programs. Brochures on water use efficiency and flyers explaining the City's ordinance prohibiting water waste are mailed to all new water service customers. The City of Camarillo's conservation message is also included in the Annual Water Quality Report (Consumer Confidence Report).

3. Indicate which and how many of the following activities are included in your public information program:

Survey Counts	Yes/No	Number of Events
a. Paid Advertising	○ Yes ● No	0
b. Public Service Announcement	○ Yes ● No	0
c. Bill Inserts / Newsletters / Brochures	● Yes ○ No	3
d. Bill showing water usage in comparison to previous year's usage	● Yes ○ No	
e. Demonstration Gardens	● Yes ○ No	1
f. Special Events, Media Events	● Yes ○ No	1
g. Speaker's Bureau	○ Yes ● No	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	○ Yes ● No	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures	8901.89	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 07: Public Information Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2007

A. Implementation

1. How is your public information program implemented?

○ Wholesaler ○ Retailer
● Mixed ○ None

Wholesaler sponsors: Metropolitan Water District

2. Describe the program and how it's organized.

The City of Camarillo publishes a quarterly newsletter in which we publish articles on the topic of water use efficiency. Brochures on water use efficiency are made available year around in the foyer of City Hall. Billing inserts are included in water bills announcing events such as Water Awareness month in May and ULFT and HECW rebate programs. Brochures on water use efficiency and flyers explaining the City's ordinance prohibiting water waste are mailed to all new water service customers. The City of Camarillo's conservation message is also included in the Annual Water Quality Report (Consumer Confidence Report).

3. Indicate which and how many of the following activities are included in your public information program:

Survey Counts	Yes/No	Number of Events
a. Paid Advertising	○ Yes ● No	0
b. Public Service Announcement	○ Yes ● No	0
c. Bill Inserts / Newsletters / Brochures	● Yes ○ No	2
d. Bill showing water usage in comparison to previous year's usage	● Yes ○ No	
e. Demonstration Gardens	○ Yes ● No	0
f. Special Events, Media Events	○ Yes ● No	0
g. Speaker's Bureau	○ Yes ● No	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	○ Yes ● No	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures	7300	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 07: Public Information Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2008

A. Implementation

1. How is your public information program implemented?

○ Wholesaler ○ Retailer
● Mixed ○ None

Wholesaler sponsors: Metropolitan Water District

2. Describe the program and how it's organized.

The City of Camarillo publishes a quarterly newsletter in which we publish articles on the topic of water use efficiency. Brochures on water use efficiency are made available year around in the foyer of City Hall. Billing inserts are included in water bills announcing events such as Water Awareness month in May and ULFT and HECW rebate programs. Brochures on water use efficiency and flyers explaining the City's ordinance prohibiting water waste are mailed to all new water service customers. The City of Camarillo's conservation message is also included in the Annual Water Quality Report (Consumer Confidence Report).

3. Indicate which and how many of the following activities are included in your public information program:

Survey Counts	Yes/No	Number of Events
a. Paid Advertising	○ Yes ● No	0
b. Public Service Announcement	○ Yes ● No	0
c. Bill Inserts / Newsletters / Brochures	● Yes ○ No	2
d. Bill showing water usage in comparison to previous year's usage	● Yes ○ No	
e. Demonstration Gardens	○ Yes ● No	0
f. Special Events, Media Events	○ Yes ● No	0
g. Speaker's Bureau	○ Yes ● No	0
h. Program to coordinate with other government agencies, industry and public interest groups and media	○ Yes ● No	

B. Conservation Information Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures	6800	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2005

A. Implementation

1.How is your school education program implemented?

● Wholesaler ○ Retailer
○ Mixed ○ None

Wholesaler sponsors: Metropolitan Water Department & Calleguas Municipal Water District

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	○ Yes ○ No			
Grades 4th-6th	○ Yes ○ No			
Grades 7th-8th	○ Yes ○ No			
High School	○ Yes ○ No			

3. Did your Agency's materials meet state education framework requirements?

○ Yes
○ No

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy)

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit:	BMP Form Status:	Year:
City of Camarillo	**100% Complete**	**2006**

A. Implementation

1.How is your school education program implemented?

- ● Wholesaler
- ○ Retailer
- ○ Mixed
- ○ None

Wholesaler sponsors: Metropolitan Water District & Calleguas Municipal Water District

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	○ Yes ○ No			
Grades 4th-6th	○ Yes ○ No			
Grades 7th-8th	○ Yes ○ No			
High School	○ Yes ○ No			

3. Did your Agency's materials meet state education framework requirements?

- ○ Yes
- ○ No

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy)

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

- ○ Yes
- ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit:
City of Camarillo

BMP Form Status:
100% Complete

Year:
2007

A. Implementation

1.How is your school education program implemented?

● Wholesaler ○ Retailer
○ Mixed ○ None

Wholesaler sponsors: Metropolitan Water District

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	○ Yes ○ No			
Grades 4th-6th	○ Yes ○ No			
Grades 7th-8th	○ Yes ○ No			
High School	○ Yes ○ No			

3. Did your Agency's materials meet state education framework requirements?

○ Yes ○ No

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy)

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 08: School Education Programs

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1.How is your school education program implemented?

● Wholesaler ○ Retailer
○ Mixed ○ None

Wholesaler sponsors: Metropolitan Water District

2. Please provide information on your school programs (by grade level):

Grade	Are grade-appropriate materials distributed?	No. of class presentations	No. of students reached	No. of teachers' workshops
Grades K-3rd	○ Yes ○ No			
Grades 4th-6th	○ Yes ○ No			
Grades 7th-8th	○ Yes ○ No			
High School	○ Yes ○ No			

3. Did your Agency's materials meet state education framework requirements? ○ Yes ○ No

4. When did your Agency begin implementing this program? (Year must be four digit mm/dd/yyyy)

B. School Education Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP? ○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	● Yes ○ No
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	● Yes ○ No
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	● Yes ○ No

Implement ONE or BOTH of the following TWO options:
- Option A: CII Water Use Survey and Customer Incentives Program
- Option B: CII Conservation Program Targets

NOTE: An agency MUST indicate implementation of at least one option to achieve 100% completion and to submit this form. An agency MUST fill out both sections if it wants to preserve the ability of complying with either option.

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	○ Yes ● No

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts

	e. Site Visit	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
	f. Evaluation of all water-using apparatus and processes	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
	g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
?	**Agency CII Customer Incentives**	**Budget ($/Year)**	**No. Awarded to Customers**	**Total $ Amount Awarded**
	h. Rebates	0	0	0
	i. Loans	0	0	0
	j. Grants	0	0	0
	k. Others	0	0	0

Option B: CII Conservation Program Targets

	5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	● Yes ○ No
?	6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	○ Yes ● No

7. System Calculated annual savings (AF/year):

CII Programs	**Avg Savings (AF/yr)**	**# Devices**	**Savings/ Device**
a. Ultra Low Flush Toilets	.035004	145	5.08
b. Dual Flush Toilets	.041748	0	0.00
c. High Efficiency Toilets	.041748	0	0.00
d. High Efficiency Urinals	.069086	0	0.00
e. Non-Water Urinals	.0921146	0	0.00
f. Commercial Clothes Washers (only coin-op; not industrial)	.116618	11	1.28
g. Cooling Tower Controllers	1.03225	0	0.00

	g. Cooling Tower Controllers	1.03225	0	0.00
	h. Food Steamers	.25	0	0.00
	i. Ice Machines	.834507	0	0.00
	j. Pre-Rinse Spray Valves	.084701	0	0.00
	k. Steam Sterilizer Retrofits	1.538	0	0.00
	l. X-ray Film Processors	2.57	0	0.00
			TOTAL System Calculated Savings:	6.36

8. Estimated annual savings (AF/yr) from agency programs not including the devices listed in Option B. 7., above:

CII Programs	Annual Savings (AF/yr)
a. Site-verified actions taken by agency.	0
b Non-site-verified actions taken by agency.	0 x 25%

Note: agencies may credit 100% of estimated annual savings of interventions that have been site verified and 25% of estimated annual savings of interventions that have not been site verified. (BMP 9 E.4.c.)

TOTAL CII Program Performance Target Savings:	**6.36 AF/Yr**

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

Question	Answer
1. Has your agency identified and ranked COMMERCIAL customers according to use?	● Yes ○ No
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	● Yes ○ No
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	● Yes ○ No

Implement ONE or BOTH of the following TWO options:
- Option A: CII Water Use Survey and Customer Incentives Program
- Option B: CII Conservation Program Targets

NOTE: An agency MUST indicate implementation of at least one option to achieve 100% completion and to submit this form. An agency MUST fill out both sections if it wants to preserve the ability of complying with either option.

Option A: CII Water Use Survey and Customer Incentives Program

Question	Answer
4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	○ Yes ● No

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts

	e. Site Visit	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
	f. Evaluation of all water-using apparatus and processes	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
	g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No
?	**Agency CII Customer Incentives**	**Budget ($/Year)**	**No. Awarded to Customers**	**Total $ Amount Awarded**
	h. Rebates	0	0	0
	i. Loans	0	0	0
	j. Grants	0	0	0
	k. Others	0	0	0

Option B: CII Conservation Program Targets

	5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	● Yes ○ No
?	6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	○ Yes ● No
?	7. System Calculated annual savings (AF/year):	

	CII Programs	**Avg Savings (AF/yr)**	**# Devices**	**Savings/ Device**
	a. Ultra Low Flush Toilets	.035004	0	0.00
	b. Dual Flush Toilets	.041748	0	0.00
	c. High Efficiency Toilets	.041748	0	0.00
	d. High Efficiency Urinals	.069086	0	0.00
	e. Non-Water Urinals	.0921146	0	0.00
	f. Commercial Clothes Washers (only coin-op; not industrial)	.116618	0	0.00
	g. Cooling Tower Controllers	1.03225	0	0.00

g. Cooling Tower Controllers	1.03225	0	0.00
h. Food Steamers	.25	1	0.25
i. Ice Machines	.834507	0	0.00
j. Pre-Rinse Spray Valves	.084701	0	0.00
k. Steam Sterilizer Retrofits	1.538	0	0.00
l. X-ray Film Processors	2.57	0	0.00
		TOTAL System Calculated Savings:	0.25

8. Estimated annual savings (AF/yr) from agency programs not including the devices listed in Option B. 7., above:

CII Programs	Annual Savings (AF/yr)
a. Site-verified actions taken by agency.	0
b Non-site-verified actions taken by agency.	0 x 25%

Note: agencies may credit 100% of estimated annual savings of interventions that have been site verified and 25% of estimated annual savings of interventions that have not been site verified. (BMP 9 E.4.c.)

TOTAL CII Program Performance Target Savings: **0.25 AF/Yr**

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	● Yes ○ No
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	● Yes ○ No
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	● Yes ○ No

Implement ONE or BOTH of the following TWO options:
• Option A: CII Water Use Survey and Customer Incentives Program
• Option B: CII Conservation Program Targets
NOTE: An agency MUST indicate implementation of at least one option to achieve 100% completion and to submit this form. An agency MUST fill out both sections if it wants to preserve the ability of complying with either option.

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	○ Yes ● No

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts

	e. Site Visit	○ Yes ● No	○ Yes ● No	○ Yes ● No
	f. Evaluation of all water-using apparatus and processes	○ Yes ● No	○ Yes ● No	○ Yes ● No
	g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	○ Yes ● No	○ Yes ● No	○ Yes ● No
?	**Agency CII Customer Incentives**	**Budget ($/Year)**	**No. Awarded to Customers**	**Total $ Amount Awarded**
	h. Rebates	0	0	0
	i. Loans	0	0	0
	j. Grants	0	0	0
	k. Others	0	0	0

?	**Option B: CII Conservation Program Targets**	
	5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	● Yes ○ No
?	6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	○ Yes ● No
?	7. System Calculated annual savings (AF/year):	

	CII Programs	**Avg Savings (AF/yr)**	**# Devices**	**Savings/ Device**
	a. Ultra Low Flush Toilets	.035004	128	4.48
	b. Dual Flush Toilets	.041748	0	0.00
	c. High Efficiency Toilets	.041748	0	0.00
	d. High Efficiency Urinals	.069086	0	0.00
	e. Non-Water Urinals	.0921146	0	0.00
	f. Commercial Clothes Washers (only coin-op; not industrial)	.116618	0	0.00
	g. Cooling Tower Controllers	1.03225	0	0.00

	g. Cooling Tower Controllers	1.03225	0	0.00
	h. Food Steamers	.25	0	0.00
	i. Ice Machines	.834507	0	0.00
	j. Pre-Rinse Spray Valves	.084701	0	0.00
	k. Steam Sterilizer Retrofits	1.538	0	0.00
	l. X-ray Film Processors	2.57	0	0.00
			TOTAL System Calculated Savings:	4.48

8. Estimated annual savings (AF/yr) from agency programs not including the devices listed in Option B. 7., above:

CII Programs	Annual Savings (AF/yr)
a. Site-verified actions taken by agency.	0
b Non-site-verified actions taken by agency.	0 x 25%

Note: agencies may credit 100% of estimated annual savings of interventions that have been site verified and 25% of estimated annual savings of interventions that have not been site verified. (BMP 9 E.4.c.)

TOTAL CII Program Performance Target Savings: **4.48 AF/Yr**

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 09: Conservation Programs for CII Accounts

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1. Has your agency identified and ranked COMMERCIAL customers according to use?	● Yes ○ No	
2. Has your agency identified and ranked INDUSTRIAL customers according to use?	● Yes ○ No	
3. Has your agency identified and ranked INSTITUTIONAL customers according to use?	● Yes ○ No	

Implement ONE or BOTH of the following TWO options:
• Option A: CII Water Use Survey and Customer Incentives Program
• Option B: CII Conservation Program Targets
NOTE: An agency MUST indicate implementation of at least one option to achieve 100% completion and to submit this form. An agency MUST fill out both sections if it wants to preserve the ability of complying with either option.

Option A: CII Water Use Survey and Customer Incentives Program

4. Is your agency operating a CII water use survey and customer incentives program for the purpose of complying with BMP 9 under this option?	○ Yes ● No

CII Surveys	Commercial Accounts	Industrial Accounts	Institutional Accounts
a. Number of New Surveys Offered	0	0	0
b. Number of New Surveys Completed	0	0	0
c. Number of Site Follow-ups of Previous Surveys (within 1 yr)	0	0	0
d. Number of Phone Follow-ups of Previous Surveys (within 1 yr)	0	0	0

CII Survey Components	Commercial Accounts	Industrial Accounts	Institutional Accounts

e. Site Visit	○ Yes ● No	○ Yes ● No	○ Yes ● No
f. Evaluation of all water-using apparatus and processes	○ Yes ● No	○ Yes ● No	○ Yes ● No
g. Customer report identifying recommended efficiency measures, paybacks and agency incentives	○ Yes ● No	○ Yes ● No	○ Yes ● No
Agency CII Customer Incentives	**Budget ($/Year)**	**No. Awarded to Customers**	**Total $ Amount Awarded**
h. Rebates	0	0	0
i. Loans	0	0	0
j. Grants	0	0	0
k. Others	0	0	0

Option B: CII Conservation Program Targets

5. Does your agency track CII program interventions and water savings for the purpose of complying with BMP 9 under this option?	● Yes ○ No
6. Does your agency document and maintain records on how savings were realized and the method of calculation for estimated savings?	○ Yes ● No

7. System Calculated annual savings (AF/year):

CII Programs	Avg Savings (AF/yr)	# Devices	Savings/ Device
a. Ultra Low Flush Toilets	.035004	152	5.32
b. Dual Flush Toilets	.041748	0	0.00
c. High Efficiency Toilets	.041748	0	0.00
d. High Efficiency Urinals	.069086	0	0.00
e. Non-Water Urinals	.0921146	0	0.00
f. Commercial Clothes Washers (only coin-op; not industrial)	.116618	0	0.00
g. Cooling Tower Controllers	1.03225	0	0.00

g. Cooling Tower Controllers	1.03225	0	0.00
h. Food Steamers	.25	0	0.00
i. Ice Machines	.834507	0	0.00
j. Pre-Rinse Spray Valves	.084701	0	0.00
k. Steam Sterilizer Retrofits	1.538	0	0.00
l. X-ray Film Processors	2.57	0	0.00
		TOTAL System Calculated Savings:	5.32

8. Estimated annual savings (AF/yr) from agency programs not including the devices listed in Option B. 7., above:

CII Programs	Annual Savings (AF/yr)
a. Site-verified actions taken by agency.	0
b Non-site-verified actions taken by agency.	0 x 25%

Note: agencies may credit 100% of estimated annual savings of interventions that have been site verified and 25% of estimated annual savings of interventions that have not been site verified. (BMP 9 E.4.c.)

TOTAL CII Program Performance Target Savings: **5.32 AF/Yr**

B. Conservation Program Expenditures for CII Accounts

	This Year	Next Year
1. Budgeted Expenditures	0	0
2. Actual Expenditures	0	

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
City of Camarillo	**100% Complete**	**2005**

A. Implementation

Water Service Rate Structure Data by Customer Class

Number of schedules:		**Use of classification:**	**Enter Rate Schedules:**
How many rate schedules does agency offer/use for...		This agency...	Click to view rates data:
1. Single-family residential accounts?	3	Uses class	SF Res
2. Multi-family residential accounts?	3	Uses class	MF Res
3. Commercial accounts?	3	Uses class	Commercial
4. Industrial accounts?	1	Uses class	Industrial
5. Institutional/ government accounts?	1	Uses class	Inst/Gov
6. Dedicated irrigation (potable water) accounts?	1	Uses class	Irrigation
7. Other accounts?	1	Uses class	Other
8. Recycled-reclaimed water accounts?	0	Does not offer	Recycled
9. Raw water (urban use) accounts?	0	Does not offer	Raw
10. Wholesale (urban use) accounts?	0	Does not offer	Wholesale

Sewer Service

11. Does your agency provide sewer service to your water customers?	● Yes ○ No
12. Does sewer service use conservation rate structures?	○ Yes ● No

	13. Has your agency made the required efforts (as prescribed in BMP 11) to have sewer services billed on conservation rates?	● Yes ○ No
	14. What water agency activities have been undertaken during the reporting period to achieve waste water agency volumetric billing in your water agency service area?	☒ Studies ☒ Meetings ☒ Workshops ☐ Identification of Impediments ☐ Letters ☐ Ordinances ☐ Financial Incentives ☐ Other ☐ None

B. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

In 2004 the City of Camarillo staff conducted studies, various workshops and meetings over a 2 1/2 year period on the matter of residential sewer collection rates based on potable water usage. A public hearing was held at a regularly scheduled City Council Meeting. The public overwhelmingly contested the recommended sewer rate structure. As a result, City Council instructed staff to formulate an equitable rate for wastewater collection and treatment.

BMP 11: Conservation Pricing

Reporting Unit:	BMP Form Status:	Year:
City of Camarillo	**100% Complete**	**2006**

A. Implementation

Water Service Rate Structure Data by Customer Class

Number of schedules:		**Use of classification:**	**Enter Rate Schedules:**
How many rate schedules does agency offer/use for...		This agency...	Click to view rates data:
1. Single-family residential accounts?	3	Uses class	SF Res
2. Multi-family residential accounts?	3	Uses class	MF Res
3. Commercial accounts?	3	Uses class	Commercial
4. Industrial accounts?	1	Uses class	Industrial
5. Institutional/ government accounts?	1	Uses class	Inst/Gov
6. Dedicated irrigation (potable water) accounts?	1	Uses class	Irrigation
7. Other accounts?	1	Uses class	Other
8. Recycled-reclaimed water accounts?	0	Does not offer	Recycled
9. Raw water (urban use) accounts?	0	Does not offer	Raw
10. Wholesale (urban use) accounts?	0	Does not serve	Wholesale

Sewer Service

11. Does your agency provide sewer service to your water customers?	● Yes ○ No
12. Does sewer service use conservation rate structures?	○ Yes ● No

	13. Has your agency made the required efforts (as prescribed in BMP 11) to have sewer services billed on conservation rates?	● Yes ○ No
	14. What water agency activities have been undertaken during the reporting period to achieve waste water agency volumetric billing in your water agency service area?	☒ Studies ☒ Meetings ☒ Workshops ☐ Identification of Impediments ☐ Letters ☐ Ordinances ☐ Financial Incentives ☐ Other ☐ None

B. "At Least As Effective As"

	1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

In 2004 the City of Camarillo staff conducted studies, various workshops and meetings over a 2 1/2 year period on the matter of residential sewer collection rates based on potable water usage. A public hearing was held at a regularly scheduled City Council Meeting. The public overwhelmingly contested the recommended sewer rate structure. As a result, City Council instructed staff to formulate an equitable rate for wastewater collection and treatment.

BMP 11: Conservation Pricing

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

Water Service Rate Structure Data by Customer Class

Select the ***Rate Structure*** assigned to the majority of your customers within a specific customer class.

Volumetric Revenue is defined as the revenue derived from the charges based on amount of water use. Water agencies typically refer to these as "commodity charges." Do NOT include: flat fees, monthly service charges, meter charges, minimum usage charges, and other revenue that is not dependant on the amount of water the customer consumes. An example of a "minimum usage" charge might be: customers are charged at least 6 units per month even if they use only 2 units.

1. Single Family Residential	
a. Rate Structure	Increasing Block
b. Total Revenue from Volumetric Rates	3,398,839.34
c. Total Revenue from Customer Meter/Service (fixed) charges	1,460,056.22
2. Multi-Family Residential	
a. Rate Structure	Increasing Block
b. Total Revenue from Volumetric Rates	408,344.24
c. Total Revenue from Customer Meter/Service (fixed) charges	81,967.98
3. Commercial	
a. Rate Structure	Uniform
b. Total Revenue from Volumetric Rates	581,439.82
c. Total Revenue from Customer Meter/Service (fixed) charges	204,589.16
4. Industrial	
a. Rate Structure	Uniform

	b. Total Revenue from Volumetric Rates	83,422.09
	c. Total Revenue from Customer Meter/Service (fixed) charges	6,547.21
	5. Institutional / Government	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	212,268.36
	c. Total Revenue from Customer Meter/Service (fixed) charges	46,771.71
	6. Dedicated Irrigation (potable)	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	1,415,844.42
	c. Total Revenue from Customer Meter/Service (fixed) charges	193,520.9
	7. Recycled-Reclaimed	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	0
	c. Total Revenue from Customer Meter/Service (fixed) charges	0
	8. Raw	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	0
	c. Total Revenue from Customer Meter/Service (fixed) charges	0
	9. Other	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	60,482.07
	c. Total Revenue from Customer Meter/Service (fixed) charges	33,590.02

B. Implementation Options

Select Either Option 1 or Option 2:

1. Option 1: Use Annual Revenue As Reported

V/(V+M) >= 70%

V = Total annual revenue from volumetric rates

M = Total annual revenue from customer meter/service (fixed) charges

2. Option 2: Use Canadian Water & Wastewater Association Rate Design Model

V/(V+M) >= V'/(V'+M')

V = Total annual revenue from volumetric rates

M = Total annual revenue from customer meter/service (fixed) charges

V' = The uniform volume rate based on the signatory's long-run incremental cost of service

M' = The associated meter charge

● Option 1
○ Option 2

a. If you selected Option 2, has your agency submitted to the Council a completed Canadian Water & Wastewater Association rate design model?	○ Yes ○ No
b. Value for V' (uniform volume rate based on agency's long-run incremental cost of service) as determined by the Canadian Water & Wastewater Association rate design model:	
c. Value for M' (meter charge associated with V' uniform volume rate) as determined by the Canadian Water & Wastewater Association rate design model:	

C. Retail Wastewater (Sewer) Rate Structure Data by Customer Class

1. Does your agency provide sewer service? (If YES, answer questions 2 - 7 below, else continue to section D.)	○ Yes ● No

2. Single Family Residential

a. Sewer Rate Structure	
b. Annual Revenue Requirement	
c. Total Revenue from Customer Commodity Charges	

3. Multi-Family Residential

a. Sewer Rate Structure	

	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	4. Commercial	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	5. Industrial	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	6. Institutional / Government	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	7. Recycled-reclaimed water	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	

D. At Least As Effective As

	1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

BMP 11: Conservation Pricing

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

Water Service Rate Structure Data by Customer Class

Select the ***Rate Structure*** assigned to the majority of your customers within a specific customer class.

Volumetric Revenue is defined as the revenue derived from the charges based on amount of water use. Water agencies typically refer to these as "commodity charges." Do NOT include: flat fees, monthly service charges, meter charges, minimum usage charges, and other revenue that is not dependant on the amount of water the customer consumes. An example of a "minimum usage" charge might be: customers are charged at least 6 units per month even if they use only 2 units.

1. Single Family Residential	
a. Rate Structure	Increasing Block
b. Total Revenue from Volumetric Rates	3,507,607.32
c. Total Revenue from Customer Meter/Service (fixed) charges	1,687,146.86
2. Multi-Family Residential	
a. Rate Structure	Increasing Block
b. Total Revenue from Volumetric Rates	423,629.97
c. Total Revenue from Customer Meter/Service (fixed) charges	94,533.87
3. Commercial	
a. Rate Structure	Uniform
b. Total Revenue from Volumetric Rates	600,897.46
c. Total Revenue from Customer Meter/Service (fixed) charges	218,831.97
4. Industrial	
a. Rate Structure	Uniform

	b. Total Revenue from Volumetric Rates	73,281.18
	c. Total Revenue from Customer Meter/Service (fixed) charges	6,912.36
	5. Institutional / Government	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	225,677.77
	c. Total Revenue from Customer Meter/Service (fixed) charges	49,853.8
	6. Dedicated Irrigation (potable)	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	1,616,442.4
	c. Total Revenue from Customer Meter/Service (fixed) charges	206,386.18
	7. Recycled-Reclaimed	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	0
	c. Total Revenue from Customer Meter/Service (fixed) charges	0
	8. Raw	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	0
	c. Total Revenue from Customer Meter/Service (fixed) charges	0
	9. Other	
	a. Rate Structure	Uniform
	b. Total Revenue from Volumetric Rates	81,612.25
	c. Total Revenue from Customer Meter/Service (fixed) charges	33,127.43

B. Implementation Options

Select Either Option 1 or Option 2:

1. Option 1: Use Annual Revenue As Reported

$V/(V+M) >= 70\%$

V = Total annual revenue from volumetric rates
M = Total annual revenue from customer meter/service (fixed) charges

2. Option 2: Use Canadian Water & Wastewater Association Rate Design Model

$V/(V+M) >= V'/(V'+M')$

V = Total annual revenue from volumetric rates
M = Total annual revenue from customer meter/service (fixed) charges
V' = The uniform volume rate based on the signatory's long-run incremental cost of service
M' = The associated meter charge

- Option 1 (selected)
- Option 2 (not selected)

a. If you selected Option 2, has your agency submitted to the Council a completed Canadian Water & Wastewater Association rate design model?	Yes (not selected) / No (not selected)
b. Value for V' (uniform volume rate based on agency's long-run incremental cost of service) as determined by the Canadian Water & Wastewater Association rate design model:	
c. Value for M' (meter charge associated with V' uniform volume rate) as determined by the Canadian Water & Wastewater Association rate design model:	

C. Retail Wastewater (Sewer) Rate Structure Data by Customer Class

1. Does your agency provide sewer service? (If YES, answer questions 2 - 7 below, else continue to section D.)	Yes (not selected) / No (selected)
2. Single Family Residential	
a. Sewer Rate Structure	
b. Annual Revenue Requirement	
c. Total Revenue from Customer Commodity Charges	
3. Multi-Family Residential	
a. Sewer Rate Structure	

	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	4. Commercial	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	5. Industrial	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	6. Institutional / Government	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	
	7. Recycled-reclaimed water	
	a. Sewer Rate Structure	
	b. Annual Revenue Requirement	
	c. Total Revenue from Customer Commodity Charges	

D. At Least As Effective As

	1. Is your agency implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
	a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

E. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

1. Does your Agency have a conservation coordinator?	● Yes ○ No	
2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	○ Yes ● No	
a. Partner agency's name:		
3. If your agency supplies the conservation coordinator:		
a. What percent is this conservation coordinator's position?	5%	
b. Coordinator's Name	Tom P. Smith	
c. Coordinator's Title	Water Superintendent	
d. Coordinator's Experience and Number of Years	29 yrs.in water industry	
e. Date Coordinator's position was created (mm/dd/yyyy)	10/10/1990	
4. Number of conservation staff (FTEs), including Conservation Coordinator.	1	

B. Conservation Staff Program Expenditures

1. Staffing Expenditures (In-house Only)	94515
2. BMP Program Implementation Expenditures	20665

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No
a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."	

D. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

1. Does your Agency have a conservation coordinator?	● Yes ○ No
2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	○ Yes ● No
a. Partner agency's name:	
3. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	5%
b. Coordinator's Name	Tom P. Smith
c. Coordinator's Title	Water Superintendent
d. Coordinator's Experience and Number of Years	30 yrs. in water industry
e. Date Coordinator's position was created (mm/dd/yyyy)	10/10/1990
4. Number of conservation staff (FTEs), including Conservation Coordinator.	1

B. Conservation Staff Program Expenditures

1. Staffing Expenditures (In-house Only)	98259
2. BMP Program Implementation Expenditures	16816

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

1. Does your Agency have a conservation coordinator?	● Yes ○ No
2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?	○ Yes ● No
a. Partner agency's name:	
3. If your agency supplies the conservation coordinator:	
a. What percent is this conservation coordinator's position?	5%
b. Coordinator's Name	Tom P. Smith
c. Coordinator's Title	Water Superintendent
d. Coordinator's Experience and Number of Years	30 yrs. in water industry
e. Date Coordinator's position was created (mm/dd/yyyy)	
4. Number of conservation staff (FTEs), including Conservation Coordinator.	2

B. Conservation Staff Program Expenditures

1. Staffing Expenditures (In-house Only)	98259
2. BMP Program Implementation Expenditures	9300

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 12: Conservation Coordinator

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

1. Does your Agency have a conservation coordinator?		● Yes ○ No
2. Is a coordinator position supplied by another agency with which you cooperate in a regional conservation program ?		○ Yes ● No
a. Partner agency's name:		
3. If your agency supplies the conservation coordinator:		
a. What percent is this conservation coordinator's position?		5%
b. Coordinator's Name	Tom P. Smith	
c. Coordinator's Title	Water Superintendent	
d. Coordinator's Experience and Number of Years	30 yrs. in water industry	
e. Date Coordinator's position was created (mm/dd/yyyy)		10/10/1990
4. Number of conservation staff (FTEs), including Conservation Coordinator.		2

B. Conservation Staff Program Expenditures

1. Staffing Expenditures (In-house Only)	98259
2. BMP Program Implementation Expenditures	8,800

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

BMP 13: Water Waste Prohibition

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area?	● Yes ○ No

a. If YES, describe the ordinance:

The City of Camarillo's Water Conservation Ordinance # 715 prohibits water waste; prohibits hosing down sidewalks, driveways, etc.; requires the use of shut-off nozzles for washing vehicles, etc.; prohibits serving of water where food is sold without the customers request; restricts landscape watering hours; requires repairs of leaks or breaks within 72 hours.

	2. Is a copy of the most current ordinance(s) on file with CUWCC?	● Yes ○ No

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Camarillo	20

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	● Yes ○ No
b. Single-pass cooling systems for new connections	● Yes ○ No
c. Non-recirculating systems in all new conveyor or car wash systems	● Yes ○ No
d. Non-recirculating systems in all new commercial laundry systems	● Yes ○ No
e. Non-recirculating systems in all new decorative fountains	● Yes ○ No
f. Other, please name: Vehicle washing without a shut off nozzle. Restricted watering	● Yes ○ No

2. Describe measures that prohibit water uses listed above:

The City of Camarillo attaches monetary penalities to the second and third citations received within a one year time frame. The fourth citation triggers the installation of a flow restrictor to be placed in the customer's water meter that limits the flow to 1 gallon per minute. The fifth citation received in a 12 month period requires that the customer's water service be terminated. The customer is then required to contact City Hall and fill out a new application for water service with an increased deposit.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	● Yes ○ No
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	○ Yes ● No
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	○ Yes ● No
c. Allow local agencies, including municipalities and special	○ Yes

districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	● No
4. Does your agency include water softener checks in home water audit programs?	○ Yes ● No
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	○ Yes ● No

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 13: Water Waste Prohibition

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area?	● Yes ○ No

a. If YES, describe the ordinance:

The City of Camarillo's Water Conservation Ordinance # 715 prohibits water waste; prohibits hosing down sidewalks, driveways, etc.; requires the use of shut-off nozzles for washing vehicles, etc.; prohibits serving of water where food is sold without the customers request; restricts landscape watering hours; requires repairs of leaks or breaks within 72 hours.

	2. Is a copy of the most current ordinance(s) on file with CUWCC?	● Yes ○ No

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Camarillo	63

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	● Yes ○ No
b. Single-pass cooling systems for new connections	● Yes ○ No
c. Non-recirculating systems in all new conveyor or car wash systems	● Yes ○ No
d. Non-recirculating systems in all new commercial laundry systems	● Yes ○ No
e. Non-recirculating systems in all new decorative fountains	● Yes ○ No
f. Other, please name: Vehicle washing without a shut off nozzle. Restricted watering	● Yes ○ No

2. Describe measures that prohibit water uses listed above:

The City of Camarillo attaches monetary penalities to the second and third citations received within a one year time frame. The fourth citation triggers the installation of a flow restrictor to be placed in the customer's water meter that limits the flow to 1 gallon per minute. The fifth citation received in a 12 month period requires that the customer's water service be terminated. The customer is then required to contact City Hall and fill out a new application for water service with an increased deposit.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	● Yes ○ No
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	○ Yes ● No
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	○ Yes ● No
c. Allow local agencies, including municipalities and special	○ Yes

districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	● No
4. Does your agency include water softener checks in home water audit programs?	○ Yes ● No
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	○ Yes ● No

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 13: Water Waste Prohibition

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area?	● Yes ○ No

a. If YES, describe the ordinance:

The City of Camarillo's Water Conservation Ordinance # 715 prohibits water waste; prohibits hosing down sidewalks, driveways, etc.; requires the use of shut-off nozzles for washing vehicles, etc.; prohibits serving of water where food is sold without the customers request; restricts landscape watering hours; requires repairs of leaks or breaks within 72 hours.

2. Is a copy of the most current ordinance(s) on file with CUWCC?	● Yes ○ No

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Camarillo	14

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	● Yes ○ No
b. Single-pass cooling systems for new connections	● Yes ○ No
c. Non-recirculating systems in all new conveyor or car wash systems	● Yes ○ No
d. Non-recirculating systems in all new commercial laundry systems	● Yes ○ No
e. Non-recirculating systems in all new decorative fountains	● Yes ○ No
f. Other, please name: Vehicle washing without a shut off nozzle. Restricted watering	● Yes ○ No

2. Describe measures that prohibit water uses listed above:

The City of Camarillo attaches monetary penalities to the second and third citations received within a one year time frame. The fourth citation triggers the installation of a flow restrictor to be placed in the customer's water meter that limits the flow to 1 gallon per minute. The fifth citation received in a 12 month period requires that the customer's water service be terminated. The customer is then required to contact City Hall and fill out a new application for water service with an increased deposit.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	● Yes ○ No
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	○ Yes ● No
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	○ Yes ● No
c. Allow local agencies, including municipalities and special	○ Yes

districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	● No
4. Does your agency include water softener checks in home water audit programs?	○ Yes ● No
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	○ Yes ● No

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 13: Water Waste Prohibition

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Requirements for Documenting BMP Implementation

1. Is a water waste prohibition ordinance in effect in your service area?	● Yes ○ No

a. If YES, describe the ordinance:

The City of Camarillo's Water Conservation Ordinance # 715 prohibits water waste; prohibits hosing down sidewalks, driveways, etc.; requires the use of shut-off nozzles for washing vehicles, etc.; prohibits serving of water where food is sold without the customers request; restricts landscape watering hours; requires repairs of leaks or breaks within 72 hours.

	2. Is a copy of the most current ordinance(s) on file with CUWCC?	● Yes ○ No

a. List local jurisdictions in your service area in the first text box and water waste ordinance citations in each jurisdiction in the second text box:

City of Camarillo	12

B. Implementation

1. Indicate which of the water uses listed below are prohibited by your agency or service area.

a. Gutter flooding	● Yes ○ No
b. Single-pass cooling systems for new connections	● Yes ○ No
c. Non-recirculating systems in all new conveyor or car wash systems	● Yes ○ No
d. Non-recirculating systems in all new commercial laundry systems	● Yes ○ No
e. Non-recirculating systems in all new decorative fountains	● Yes ○ No
f. Other, please name: Vehicle washing without a shut off nozzle. Restricted watering	● Yes ○ No

2. Describe measures that prohibit water uses listed above:

The City of Camarillo attaches monetary penalities to the second and third citations received within a one year time frame. The fourth citation triggers the installation of a flow restrictor to be placed in the customer's water meter that limits the flow to 1 gallon per minute. The fifth citation received in a 12 month period requires that the customer's water service be terminated. The customer is then required to contact City Hall and fill out a new application for water service with an increased deposit.

Water Softeners:

3. Indicate which of the following measures your agency has supported in developing state law:

a. Allow the sale of more efficient, demand-initiated regenerating DIR models.	● Yes ○ No
b. Develop minimum appliance efficiency standards that:	
i.) Increase the regeneration efficiency standard to at least 3,350 grains of hardness removed per pound of common salt used.	○ Yes ● No
ii.) Implement an identified maximum number of gallons discharged per gallon of soft water produced.	○ Yes ● No
c. Allow local agencies, including municipalities and special	○ Yes

districts, to set more stringent standards and/or to ban on-site regeneration of water softeners if it is demonstrated and found by the agency governing board that there is an adverse effect on the reclaimed water or groundwater supply.	● No
4. Does your agency include water softener checks in home water audit programs?	○ Yes ● No
5. Does your agency include information about DIR and exchange-type water softeners in educational efforts to encourage replacement of less efficient timer models?	○ Yes ● No

C. Water Waste Prohibition Program Expenditures

	This Year	Next Year
1. Budgeted Expenditures		
2. Actual Expenditures		

D. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

E. Comments

BMP 14: Residential ULFT Replacement Programs		
Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2005**

A. Implementation

Number of Non-Efficient Toilets Replaced With 1.6 gpf Toilets

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets (1.6 gpf)?	● Yes ○ No	● Yes ○ No
Replacement Method	**SF Accounts**	**MF Units**
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	20	6
5. Other	0	0
Total	**20**	**6**

Number of Non-Efficient Toilets Replaced With 1.28 gpf HETs

	Single-Family Accounts	Multi-Family Units
6. Does your Agency have program(s) for replacing high-water-using toilets with high-efficiency toilets (1.2 gpf)?	○ Yes ● No	○ Yes ● No
Replacement Method	**SF Accounts**	**MF Units**
7. Rebate	0	0
8. Direct Install	0	0
9. CBO Distribution	0	0
10. Other	0	0
Total	**0**	**0**

Number of Non-Efficient Toilets Replaced w/ 1.2 gpf HETs (dual-flush)			
		Single-Family Accounts	**Multi-Family Units**
	11. Does your Agency have program(s) for replacing high-water-using toilets with dual flush toilets?	○ Yes ● No	○ Yes ● No
	Replacement Method	**SF Accounts**	**MF Units**
	12. Rebate	0	0
	13. Direct Install	0	0
	14. CBO Distribution	0	0
	15. Other	0	0
	Total	**0**	**0**
	As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying single family dwellings.		
	As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying multi-family dwellings.		

18. Is a toilet retrofit on resale ordinance in effect for your service area?

○ Yes
● No

19. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

City of Camarillo	

B. Residential ULFT Program Expenditures

1. Estimated cost per ULFT/HET replacement: 57.4

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?

○ Yes
● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The City of Camarillo has conducted 2 ULFT Rebate programs and 4 ULFT Direct Distribution Programs. During the last Direct Distribution Program 37% of the ULFTs requested were not picked up. Similar lack of interest has occured during previous programs. The City has decided to not have a ULFT program for the last two years but have Drop-Ship ULFT Program scheduled for the first part of 2007.

BMP 14: Residential ULFT Replacement Programs		
Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2006**

A. Implementation

Number of Non-Efficient Toilets Replaced With 1.6 gpf Toilets

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets (1.6 gpf)?	● Yes ○ No	● Yes ○ No
Replacement Method	**SF Accounts**	**MF Units**
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	0	0
5. Other	0	0
Total	**0**	**0**

Number of Non-Efficient Toilets Replaced With 1.28 gpf HETs

	Single-Family Accounts	Multi-Family Units
6. Does your Agency have program(s) for replacing high-water-using toilets with high-efficiency toilets (1.2 gpf)?	○ Yes ● No	○ Yes ● No
Replacement Method	**SF Accounts**	**MF Units**
7. Rebate	0	0
8. Direct Install	0	0
9. CBO Distribution	0	0
10. Other	0	0
Total	**0**	**0**

Number of Non-Efficient Toilets Replaced w/ 1.2 gpf HETs (dual-flush)			
		Single-Family Accounts	**Multi-Family Units**
	11. Does your Agency have program(s) for replacing high-water-using toilets with dual flush toilets?	○ Yes ● No	○ Yes ● No
	Replacement Method	**SF Accounts**	**MF Units**
	12. Rebate	0	0
	13. Direct Install	0	0
	14. CBO Distribution	0	0
	15. Other	0	0
	Total	**0**	**0**

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying single family dwellings

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying multi-family dwellings.

	18. Is a toilet retrofit on resale ordinance in effect for your service area?	○ Yes ● No

19. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:

City of Camarillo	

B. Residential ULFT Program Expenditures

1. Estimated cost per ULFT/HET replacement:	0

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The City of Camarillo has conducted 2 ULFT Rebate programs and 4 ULFT Direct Distribution Programs. During the last Direct Distribution Program 37% of the ULFTs requested were not picked up. Similar lack of interest has occured during previous programs. The City has decided to not have a ULFT program for the last two years but have Drop-Ship ULFT Program scheduled for the first part of 2007.

BMP 14: Residential ULFT Replacement Programs		
Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2007**

A. Implementation

Number of Non-Efficient Toilets Replaced With 1.6 gpf Toilets

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets (1.6 gpf)?	● Yes ○ No	● Yes ○ No
Replacement Method	**SF Accounts**	**MF Units**
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	196	26
5. Other	0	0
Total	**196**	**26**

Number of Non-Efficient Toilets Replaced With 1.28 gpf HETs

	Single-Family Accounts	Multi-Family Units
6. Does your Agency have program(s) for replacing high-water-using toilets with high-efficiency toilets (1.2 gpf)?	○ Yes ● No	○ Yes ● No
Replacement Method	**SF Accounts**	**MF Units**
7. Rebate	0	0
8. Direct Install	0	0
9. CBO Distribution	39	3
10. Other	0	0
Total	**39**	**3**

Number of Non-Efficient Toilets Replaced w/ 1.2 gpf HETs (dual-flush)			
		Single-Family Accounts	**Multi-Family Units**
	11. Does your Agency have program(s) for replacing high-water-using toilets with dual flush toilets?	○ Yes ● No	○ Yes ● No
	Replacement Method	**SF Accounts**	**MF Units**
	12. Rebate	0	0
	13. Direct Install	0	0
	14. CBO Distribution	0	0
	15. Other	0	0
	Total	**0**	**0**

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying single family dwellings

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying multi-family dwellings.

	18. Is a toilet retrofit on resale ordinance in effect for your service area?	○ Yes ● No
	19. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:	
	City of Camarillo	0

B. Residential ULFT Program Expenditures

1. Estimated cost per ULFT/HET replacement:	250

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The City of Camarillo has conducted 2 ULFT Rebate programs and 4 ULFT Direct Distribution Programs. During the last Direct Distribution Program 37% of the ULFTs requested were not picked up. Similar lack of interest has occurred during previous programs. The City implemented the ULFT program for the 2007 and 2008 as a Drop-Ship ULFT Program.

BMP 14: Residential ULFT Replacement Programs

Reporting Unit: **City of Camarillo**	BMP Form Status: **100% Complete**	Year: **2008**

A. Implementation

Number of Non-Efficient Toilets Replaced With 1.6 gpf Toilets

	Single-Family Accounts	Multi-Family Units
1. Does your Agency have program(s) for replacing high-water-using toilets with ultra-low flush toilets (1.6 gpf)?	● Yes ○ No	● Yes ○ No
Replacement Method	**SF Accounts**	**MF Units**
2. Rebate	0	0
3. Direct Install	0	0
4. CBO Distribution	2	1
5. Other	0	0
Total	**2**	**1**

Number of Non-Efficient Toilets Replaced With 1.28 gpf HETs

	Single-Family Accounts	Multi-Family Units
6. Does your Agency have program(s) for replacing high-water-using toilets with high-efficiency toilets (1.2 gpf)?	○ Yes ● No	○ Yes ● No
Replacement Method	**SF Accounts**	**MF Units**
7. Rebate	0	0
8. Direct Install	0	0
9. CBO Distribution	13	0
10. Other	0	0
Total	**13**	**0**

Number of Non-Efficient Toilets Replaced w/ 1.2 gpf HETs (dual-flush)		
	Single-Family Accounts	**Multi-Family Units**
11. Does your Agency have program(s) for replacing high-water-using toilets with dual flush toilets?	○ Yes ● No	○ Yes ● No
Replacement Method	**SF Accounts**	**MF Units**
12. Rebate	0	0
13. Direct Install	0	0
14. CBO Distribution	0	0
15. Other	0	0
Total	**0**	**0**

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying single family dwellings

As staffing permits, the City of Camarillo implements ULFT Direct Distribution programs for residential customers occupying multi-family dwellings.

	18. Is a toilet retrofit on resale ordinance in effect for your service area?	○ Yes ● No
	19. List local jurisdictions in your service area in the left box and ordinance citations in each jurisdiction in the right box:	

City of Camarillo	0

B. Residential ULFT Program Expenditures

1. Estimated cost per ULFT/HET replacement:	250

C. "At Least As Effective As"

1. Is your AGENCY implementing an "at least as effective as" variant of this BMP?	○ Yes ● No

a. If YES, please explain in detail how your implementation of this BMP differs from Exhibit 1 and why you consider it to be "at least as effective as."

D. Comments

The City of Camarillo has conducted 2 ULFT Rebate programs and 4 ULFT Direct Distribution Programs. During the last Direct Distribution Program 37% of the ULFTs requested were not picked up. Similar lack of interest has occurred during previous programs. The City implemented the ULFT program for the 2007 and 2008 as a Drop-Ship ULFT Program.

APPENDIX G

URBAN WATER MANAGEMENT PLAN ACT

This Page Left Blank Intentionally

Established: AB 797, Klehs, 1983
Amended: AB 2661, Klehs, 1990
AB 11X, Filante, 1991
AB 1869, Speier, 1991
AB 892, Frazee, 1993
SB 1017, McCorquodale, 1994
AB 2853, Cortese, 1994
AB 1845, Cortese, 1995
SB 1011, Polanco, 1995
AB 2552, Bates, 2000
SB 553, Kelley, 2000
SB 610, Costa, 2001
AB 901, Daucher, 2001
SB 672, Machado, 2001
SB 1348, Brulte, 2002
SB 1384, Costa, 2002
SB 1518, Torlakson, 2002
AB 105, Wiggins, 2004
SB 318, Alpert, 2004
SB 1087, Florez, 2005
SBX7 7, Steinberg, 2009

CALIFORNIA WATER CODE DIVISION 6
PART 2.6. URBAN WATER MANAGEMENT PLANNING

CHAPTER 1. GENERAL DECLARATION AND POLICY

10610. This part shall be known and may be cited as the "Urban Water Management Planning Act."

10610.2. (a) The Legislature finds and declares all of the following:

(1) The waters of the state are a limited and renewable resource subject to ever-increasing demands.

(2) The conservation and efficient use of urban water supplies are of statewide concern; however, the planning for that use and the implementation of those plans can best be accomplished at the local level.

(3) A long-term, reliable supply of water is essential to protect the productivity of California's businesses and economic climate.

(4) As part of its long-range planning activities, every urban water supplier should make every effort to ensure the appropriate level of reliability in its water service sufficient to meet the needs of its various categories of customers during normal, dry, and multiple dry water years.

(5) Public health issues have been raised over a number of contaminants that have been identified in certain local and imported water supplies.

(6) Implementing effective water management strategies, including groundwater storage projects and recycled water projects, may require specific water quality and salinity targets for meeting groundwater basins water quality objectives and promoting beneficial use of recycled water.

(7) Water quality regulations are becoming an increasingly important factor in water agencies' selection of raw water sources, treatment alternatives, and modifications to existing treatment facilities.

(8) Changes in drinking water quality standards may also impact the usefulness of water supplies and may ultimately impact supply reliability.

(9) The quality of source supplies can have a significant impact on water management strategies and supply reliability.

(b) This part is intended to provide assistance to water agencies in carrying out their long-term resource planning responsibilities to ensure adequate water supplies to meet existing and future demands for water.

10610.4. The Legislature finds and declares that it is the policy of the state as follows:

(a) The management of urban water demands and efficient use of water shall be actively pursued to protect both the people of the state and their water resources.

(b) The management of urban water demands and efficient use of urban water supplies shall be a guiding criterion in public decisions.

(c) Urban water suppliers shall be required to develop water management plans to actively pursue the efficient use of available supplies.

CHAPTER 2. DEFINITIONS

10611. Unless the context otherwise requires, the definitions of this chapter govern the construction of this part.

10611.5. "Demand management" means those water conservation measures, programs, and incentives that prevent the waste of water and promote the reasonable and efficient use and reuse of available supplies.

10612. "Customer" means a purchaser of water from a water supplier who uses the water for municipal purposes, including residential, commercial, governmental, and industrial uses.

10613. "Efficient use" means those management measures that result in the most effective use of water so as to prevent its waste or unreasonable use or unreasonable method of use.

10614. "Person" means any individual, firm, association, organization, partnership, business, trust, corporation, company, public agency, or any agency of such an entity.

10615. "Plan" means an urban water management plan prepared pursuant to this part. A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities. The components of the plan may vary according to an individual community or area's characteristics and its capabilities to efficiently use and conserve water. The plan shall address measures for residential, commercial, governmental, and industrial water demand management as set forth in Article 2 (commencing with Section 10630) of Chapter 3. In addition, a strategy and time schedule for implementation shall be included in the plan.

10616. "Public agency" means any board, commission, county, city and county, city, regional agency, district, or other public entity.

10616.5. "Recycled water" means the reclamation and reuse of wastewater for beneficial use.

10617. "Urban water supplier" means a supplier, either publicly or privately owned, providing water for municipal purposes either directly or indirectly to more than 3,000 customers or supplying more than 3,000 acre-feet of water annually. An urban water supplier includes a supplier or contractor for water, regardless of the basis of right, which distributes or sells for ultimate resale to customers. This part applies only to water supplied from public water systems subject to Chapter 4 (commencing with Section 116275) of Part 12 of Division 104 of the Health and Safety Code.

CHAPTER 3. URBAN WATER MANAGEMENT PLANS
Article 1. General Provisions

10620.

(a) Every urban water supplier shall prepare and adopt an urban water management plan in the manner set forth in Article 3 (commencing with Section 10640).

(b) Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.

(c) An urban water supplier indirectly providing water shall not include planning elements in its water management plan as provided in Article 2 (commencing with Section 10630) that would be applicable to urban water suppliers or public agencies directly providing water, or to their customers, without the consent of those suppliers or public agencies.

(d)

(1) An urban water supplier may satisfy the requirements of this part by participation in areawide, regional, watershed, or basinwide urban water management planning where those plans will reduce preparation costs and contribute to the achievement of conservation and efficient water use.

(2) Each urban water supplier shall coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.

(e) The urban water supplier may prepare the plan with its own staff, by contract, or in cooperation with other governmental agencies.

(f) An urban water supplier shall describe in the plan water management tools and options used by that entity that will maximize resources and minimize the need to import water from other regions.

10621.

(a) Each urban water supplier shall update its plan at least once every five years on or before December 31, in years ending in five and zero.

(b) Every urban water supplier required to prepare a plan pursuant to this part shall notify any city or county within which the supplier provides water supplies that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. The urban water supplier may consult with, and obtain comments from, any city or county that receives notice pursuant to this subdivision.

(c) The amendments to, or changes in, the plan shall be adopted and filed in the manner set forth in Article 3 (commencing with Section 10640).

Article 2. Contents of Plans

10630. It is the intention of the Legislature, in enacting this part, to permit levels of water management planning commensurate with the numbers of customers served and the volume of water supplied.

10631. A plan shall be adopted in accordance with this chapter and shall do all of the following:

(a) Describe the service area of the supplier, including current and projected population, climate, and other demographic factors affecting the supplier's water management planning. The projected population estimates shall be based upon data from the state, regional, or local service agency population projections within the service area of the urban water supplier and shall be in five-year increments to 20 years or as far as data is available.

(b) Identify and quantify, to the extent practicable, the existing and planned sources of water available to the supplier over the same five-year increments described in subdivision (a). If groundwater is identified as an existing or planned source of water available to the supplier, all of the following information shall be included in the plan:

(1) A copy of any groundwater management plan adopted by the urban water supplier, including plans adopted pursuant to Part 2.75 (commencing with Section 10750), or any other specific authorization for groundwater management.

(2) A description of any groundwater basin or basins from which the urban water supplier pumps groundwater. For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the urban water supplier has the legal right to pump under the order or decree.

For basins that have not been adjudicated, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current official departmental bulletin that characterizes the condition of the groundwater basin, and a detailed description of the efforts being undertaken by the urban water supplier to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the

past five years. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the urban water supplier. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(c) Describe the reliability of the water supply and vulnerability to seasonal or climatic shortage, to the extent practicable, and provide data for each of the following:

(1) An average water year.
(2) A single dry water year.
(3) Multiple dry water years.

For any water source that may not be available at a consistent level of use, given specific legal, environmental, water quality, or climatic factors, describe plans to supplement or replace that source with alternative sources or water demand management measures, to the extent practicable.

(d) Describe the opportunities for exchanges or transfers of water on a short-term or long-term basis.

(e)

(1) Quantify, to the extent records are available, past and current water use, over the same five-year increments described in subdivision (a), and projected water use, identifying the uses among water use sectors including, but not necessarily limited to, all of the following uses:

(A) Single-family residential.
(B) Multifamily.
(C) Commercial.
(D) Industrial.
(E) Institutional and governmental.
(F) Landscape.
(G) Sales to other agencies.
(H) Saline water intrusion barriers, groundwater recharge, or conjunctive use, or any combination thereof.
(I) Agricultural.

(2) The water use projections shall be in the same five-year increments described in subdivision (a).

(f) Provide a description of the supplier's water demand management measures. This description shall include all of the following:

(1) A description of each water demand management measure that is currently being implemented, or scheduled for implementation, including the steps necessary to implement any proposed measures, including, but not limited to, all of the following:

(A) Water survey programs for single-family residential and multifamily residential customers.

(B) Residential plumbing retrofit.

(C) System water audits, leak detection, and repair.

(D) Metering with commodity rates for all new connections and retrofit of existing connections.

(E) Large landscape conservation programs and incentives.

(F) High-efficiency washing machine rebate programs.

(G) Public information programs.

(H) School education programs.

(I) Conservation programs for commercial, industrial, and institutional accounts.

(J) Wholesale agency programs.

(K) Conservation pricing.

(L) Water conservation coordinator.

(M) Water waste prohibition.

(N) Residential ultra-low-flush toilet replacement programs.

(2) A schedule of implementation for all water demand management measures proposed or described in the plan.

(3) A description of the methods, if any, that the supplier will use to evaluate the effectiveness of water demand management measures implemented or described under the plan.

(4) An estimate, if available, of existing conservation savings on water use within the supplier's service area, and the effect of the savings on the supplier's ability to further reduce demand.

(g) An evaluation of each water demand management measure listed in paragraph (1) of subdivision (f) that is not currently being implemented or scheduled for implementation. In the course of the evaluation, first consideration shall be given to water demand management measures, or combination of measures, that offer lower incremental costs than expanded or additional water supplies. This evaluation shall do all of the following:

(1) Take into account economic and noneconomic factors, including environmental, social, health, customer impact, and technological factors.

(2) Include a cost-benefit analysis, identifying total benefits and total costs.

(3) Include a description of funding available to implement any planned water supply project that would provide water at a higher unit cost.

(4) Include a description of the water supplier's legal authority to implement the measure and efforts to work with other relevant agencies to ensure the implementation of the measure and to share the cost of implementation.

(h) Include a description of all water supply projects and water supply programs that may be undertaken by the urban water supplier to meet the total projected water use as established pursuant to subdivision (a) of Section 10635. The urban water supplier shall include a detailed description of expected future projects and programs, other than the demand management programs identified pursuant to paragraph (1) of subdivision (f), that the urban water supplier may implement to increase the amount of the water supply available to the urban water supplier in average, single-dry, and multiple-dry water years. The description shall identify specific projects and include a description of the increase in water supply that is expected to be available from each project. The description shall include an estimate with regard to the implementation timeline for each project or program.

(i) Describe the opportunities for development of desalinated water, including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

(j) Urban water suppliers that are members of the California Urban Water Conservation Council and submit annual reports to that council in accordance with the ''Memorandum of Understanding Regarding Urban Water Conservation in California,'' dated September 1991, may submit the annual reports identifying water demand management measures currently being implemented, or scheduled for implementation, to satisfy the requirements of subdivisions (f) and (g).

(k) Urban water suppliers that rely upon a wholesale agency for a source of water, shall provide the wholesale agency with water use projections from that agency for that source of water in five-year increments to 20 years or as far as data is available. The wholesale agency shall provide information to the urban water supplier for inclusion in the urban water supplier's plan that identifies and quantifies, to the extent practicable, the existing and planned sources of water as required by subdivision (b), available from the wholesale agency to the urban water supplier over the same five-year increments, and during various water-year types in accordance with subdivision (c). An urban water supplier may rely upon water supply information provided by the wholesale agency in fulfilling the plan informational requirements of subdivisions (b) and (c), including, but not limited to, ocean water, brackish water, and groundwater, as a long-term supply.

10631.5. The department shall take into consideration whether the urban water supplier is implementing or scheduled for implementation, the water demand management activities that the urban water supplier identified in its urban water management plan, pursuant to Section 10631, in evaluating applications for grants and loans made available pursuant to Section 79163. The urban water supplier may submit to the department copies of its annual reports and other relevant documents to assist the department in determining whether the urban water supplier is implementing or scheduling the implementation of water demand management activities.

10632. The plan shall provide an urban water shortage contingency analysis which includes each of the following elements which are within the authority of the urban water supplier:

(a) Stages of action to be undertaken by the urban water supplier in response to water supply shortages, including up to a 50 percent reduction in water supply, and an outline of specific water supply conditions which are applicable to each stage.

(b) An estimate of the minimum water supply available during each of the next three water years based on the driest three-year historic sequence for the agency's water supply.

(c) Actions to be undertaken by the urban water supplier to prepare for, and implement during, a catastrophic interruption of water supplies including, but not limited to, a regional power outage, an earthquake, or other disaster.

(d) Additional, mandatory prohibitions against specific water use practices during water shortages, including, but not limited to, prohibiting the use of potable water for street cleaning.

(e) Consumption reduction methods in the most restrictive stages. Each urban water supplier may use any type of consumption reduction methods in its water shortage contingency analysis that would reduce water use, are appropriate for its area, and have the ability to achieve a water use reduction consistent with up to a 50 percent reduction in water supply.

(f) Penalties or charges for excessive use, where applicable.

(g) An analysis of the impacts of each of the actions and conditions described in subdivisions (a) to (f), inclusive, on the revenues and expenditures of the urban water supplier, and proposed measures to overcome those impacts, such as the development of reserves and rate adjustments.

(h) A draft water shortage contingency resolution or ordinance.

(i) A mechanism for determining actual reductions in water use pursuant to the urban water shortage contingency analysis.

10633. The plan shall provide, to the extent available, information on recycled water and its potential for use as a water source in the service area of the urban water supplier. The preparation of the plan shall be coordinated with local water, wastewater, groundwater, and planning agencies that operate within the supplier's service area, and shall include all of the following:

(a) A description of the wastewater collection and treatment systems in the supplier's service area, including a quantification of the amount of wastewater collected and treated and the methods of wastewater disposal.

(b) A description of the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.

(c) A description of the recycled water currently being used in the supplier's service area, including, but not limited to, the type, place, and quantity of use.

(d) A description and quantification of the potential uses of recycled water, including, but not limited to, agricultural irrigation, landscape irrigation, wildlife habitat enhancement, wetlands, industrial reuse, groundwater recharge, and other appropriate uses, and a determination with regard to the technical and economic feasibility of serving those uses.

(e) The projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected pursuant to this subdivision.

(f) A description of actions, including financial incentives, which may be taken to encourage the use of recycled water, and the projected results of these actions in terms of acre-feet of recycled water used per year.

(g) A plan for optimizing the use of recycled water in the supplier's service area, including actions to facilitate the installation of dual distribution systems, to promote recirculating uses, to facilitate the increased use of treated wastewater that meets recycled water standards, and to overcome any obstacles to achieving that increased use.

10634. The plan shall include information, to the extent practicable, relating to the quality of existing sources of water available to the supplier over the same five-year increments as described in subdivision (a) of Section 10631, and the manner in which water quality affects water management strategies and supply reliability.

Article 2.5 Water Service Reliability

10635.

(a) Every urban water supplier shall include, as part of its urban water management plan, an assessment of the reliability of its water service to its customers during normal, dry, and multiple dry water years. This water supply and demand assessment shall compare the total water supply sources available to the water supplier with the total projected water use over the next 20 years, in five-year increments, for a normal water year, a single dry water year, and multiple dry water years. The water service reliability assessment shall be based upon the information compiled pursuant to Section 10631, including available data from state, regional, or local agency population projections within the service area of the urban water supplier.

(b) The urban water supplier shall provide that portion of its urban water management plan prepared pursuant to this article to any city or county within which it provides water supplies no later than 60 days after the submission of its urban water management plan.

(c) Nothing in this article is intended to create a right or entitlement to water service or any specific level of water service.

(d) Nothing in this article is intended to change existing law concerning an urban water supplier's obligation to provide water service to its existing customers or to any potential future customers.

Articl 3. Adoption and Implementation of Plans

10640. Every urban water supplier required to prepare a plan pursuant to this part shall prepare its plan pursuant to Article 2 (commencing with Section 10630).

The supplier shall likewise periodically review the plan as required by Section 10621, and any amendments or changes required as a result of that review shall be adopted pursuant to this article.

10641. An urban water supplier required to prepare a plan may consult with, and obtain comments from, any public agency or state agency or any person who has special expertise with respect to water demand management methods and techniques.

10642. Each urban water supplier shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan. Prior to adopting a plan, the urban water supplier shall make the plan available for public inspection and shall hold a public hearing thereon. Prior to the hearing, notice of the time and place of hearing shall be published within the jurisdiction of the publicly owned water supplier pursuant to Section 6066 of the Government Code. The urban water supplier shall provide notice of the time and place of hearing to any city or county within which the supplier provides water supplies. A privately owned water supplier shall provide an equivalent notice within its service area. After the hearing, the plan shall be adopted as prepared or as modified after the hearing.

10643. An urban water supplier shall implement its plan adopted pursuant to this chapter in accordance with the schedule set forth in its plan.

10644.

(a) An urban water supplier shall file with the department and any city or county within which the supplier provides water supplies a copy of its plan no later than 30 days after adoption. Copies of amendments or changes to the plans shall be filed with the department and any city or county within which the supplier provides water supplies within 30 days after adoption.

(b) The department shall prepare and submit to the Legislature, on or before December 31, in the years ending in six and one, a report summarizing the status of the plans adopted pursuant to this part. The report prepared by the department shall identify the outstanding elements of the individual plans. The department shall provide a copy of the report to each urban water supplier that has filed its plan with the department. The department shall also prepare reports and provide data for any legislative hearings designed to consider the effectiveness of plans submitted pursuant to this part.

10645. Not later than 30 days after filing a copy of its plan with the department, the urban water supplier and the department shall make the plan available for public review during normal business hours.

CHAPTER 4. MISCELLANEOUS PROVISIONS

10650. Any actions or proceedings to attack, review, set aside, void, or annul the acts or decisions of an urban water supplier on the grounds of noncompliance with this part shall be commenced as follows:

(a) An action or proceeding alleging failure to adopt a plan shall be commenced within 18 months after that adoption is required by this part.

(b) Any action or proceeding alleging that a plan, or action taken pursuant to the plan, does not comply with this part shall be commenced within 90 days after filing of the plan or amendment thereto pursuant to Section 10644 or the taking of that action.

10651. In any action or proceeding to attack, review, set aside, void, or annul a plan, or an action taken pursuant to the plan by an urban water supplier on the grounds of noncompliance with this part, the inquiry shall extend only to whether there was a prejudicial abuse of discretion. Abuse of discretion is established if the supplier has not proceeded in a manner required by law or if the action by the water supplier is not supported by substantial evidence.

10652. The California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) does not apply to the preparation and adoption of plans pursuant to this part or to the implementation of actions taken pursuant to Section 10632. Nothing in this part shall be interpreted as exempting from the California Environmental Quality Act any project that would significantly affect water supplies for fish and wildlife, or any project for implementation of the plan, other than projects implementing Section 10632, or any project for expanded or additional water supplies.

10653. The adoption of a plan shall satisfy any requirements of state law, regulation, or order, including those of the State Water Resources Control Board and the Public Utilities Commission, for the preparation of water management plans or conservation plans; provided, that if the State Water Resources Control Board or the Public Utilities Commission requires additional information concerning water conservation to implement its existing authority, nothing in this part shall be deemed to limit the board or the commission in obtaining that information. The requirements of this part shall be satisfied by any urban water demand management plan prepared to meet federal laws or regulations after the effective date of this part, and which substantially meets the requirements of this part, or by any existing urban water management plan which includes the contents of a plan required under this part.

10654. An urban water supplier may recover in its rates the costs incurred in preparing its plan and implementing the reasonable water conservation measures included in the plan. Any best water management practice that is included in the plan that is identified in the "Memorandum of Understanding Regarding Urban Water Conservation in California" is deemed to be reasonable for the purposes of this section.

10655. If any provision of this part or the application thereof to any person or circumstances is held invalid, that invalidity shall not affect other provisions or applications of this part which can be given effect without the invalid provision or application thereof, and to this end the provisions of this part are severable.

10656. An urban water supplier that does not prepare, adopt, and submit its urban water management plan to the department in accordance with this part, is ineligible to receive funding pursuant to Division 24 (commencing with Section 78500) or Division 26 (commencing with Section 79000), or receive drought assistance from the state until the urban water management plan is submitted pursuant to this article.

10657.

(a) The department shall take into consideration whether the urban water supplier has submitted an updated urban water management plan that is consistent with Section 10631, as amended by the act that adds this section, in determining whether the urban water supplier is eligible for funds made available pursuant to any program administered by the department.

(b) This section shall remain in effect only until January 1, 2006, and as of that date is repealed, unless a later enacted statute, that is enacted before January 1, 2006, deletes or extends that date.

APPENDIX H

WATER SUPPLY RELIABILITY CALCULATION DETAILS

1. Average Year Conditions

Table 1 **City of Camarillo Projected Average Year Water Demands**

Description	2015	2020	2025	2030	2035
Projected Average Year Demand (afy)	10,564	9,652	9,875	10,069	10,194
Increase Compared to 2010[1] (afy)	(465)	(1,377)	(1,154)	(960)	(835)
Increase Compared to 2010	-4%	-12%	-10%	-9%	-8%
Demand as % of 2010 Demand	96%	88%	90%	91%	92%

Notes:

1) Based on an 2010 Average Year Demand of 11,029 afy.

Table 2 **MWDSC Projected Average Year Supplies**

Description	2015	2020	2025	2030	2035
Average Year Supply[1] (afy)	3,485,000	3,810,000	4,089,000	3,947,000	3,814,000
Increase Compared to 2010[2] (afy)	817,000	1,142,000	1,421,000	1,279,000	1,146,000
Increase Compared to 2010	31%	43%	53%	48%	43%
Supply as % of 2010 Supply	131%	143%	153%	148%	143%

Notes:

1) Based on the current supply programs as listed in Table 2-11 from the 2010 Regional UWMP.

2) Based on the projected supply capacity of 2,668,000 afy obtained from 2005 Regional UWMP.

Table 3 **MWDSC Projected Average Year Supply as Percentage of Demand**

Description	2015	2020	2025	2030	2035
Average Year Supply[1] (afy)	3,485,000	3,810,000	4,089,000	3,947,000	3,814,000
Average Year Demand[2] (afy)	2,006,000	1,933,000	1,985,000	2,049,000	2,106,000
MWDSC Supply as % of Demand	174%	197%	206%	193%	181%

Notes:

1) Based on the current supply programs as listed in Table 2-11 from the 2010 Regional UWMP.

2) Based on total demands on Metropolitan as listed in Table 2-11 from the 2010 Regional UWMP.

Table 4	Comparison of Supply and Demands under a Normal Year					
Row	**Description**	**2015**	**2020**	**2025**	**2030**	**2035**
1	City of Camarillo Demand Increase as % of 2010 Demand (from Table 1)	96%	88%	90%	91%	92%
2	MWDSC Supply Increase as % of 2010 Supply (from Table 2)	131%	143%	153%	148%	143%
3	MWDSC Supply as % of Demand (from Table 3)	174%	197%	206%	193%	181%
4	**Difference MWDSC Supply Increase and City of Camarillo Demand Increase (Row 3 – Row 1)**	**78%**	**110%**	**116%**	**101%**	**89%**

2. Single Dry Year Conditions

Table 5	City of Camarillo Projected Single Dry Year Water Demands				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Projected Average Year Demand (afy)	11,878	10,853	11,103	11,321	11,462
Increase Compared to 2010[(1)] (afy)	849	(176)	74	292	433
Increase Compared to 2010	8%	-2%	1%	3%	4%
Demand as % of 2010 Demand	108%	98%	101%	103%	104%

Notes:

1) Based on an 2010 Average Year Demand of 11,029 afy.

Table 6	MWDSC Projected Single Dry Year Supplies				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Average Year Supply[(1)] (afy)	2,457,000	2,782,000	2,977,000	2,823,000	2,690,000
Increase Compared to 2010[(2)] (afy)	(385,000)	(60,000)	135,000	(19,000)	(152,000)
Increase Compared to 2010	-14%	-2%	5%	-1%	-5%
Supply as % of 2010 Supply	86%	98%	105%	99%	95%

Notes:

1) Based on the current supply programs as listed in Table 2-9 from the 2010 Regional UWMP.

2) Based on the projected supply capacity of 2,842,000 afy obtained from 2005 Regional UWMP.

Table 7	MWDSC Projected Single Dry Year Supply as Percentage of Demand				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Average Year Supply[1] (afy)	2,457,000	2,782,000	2,977,000	2,823,000	2,690,000
Average Year Demand[2] (afy)	2,171,000	2,162,000	2,201,000	2,254,000	2,319,000
MWDSC Supply as % of Demand	113%	129%	135%	125%	116%

Notes:

1) Based on the current supply programs as listed in Table 2-9 from the 2010 Regional UWMP.

2) Based on total demands on Metropolitan as listed in Table 2-9 from the 2010 Regional UWMP.

Table 8	Comparison of Supply and Demands under a Single Dry Year					
Row	**Description**	**2015**	**2020**	**2025**	**2030**	**2035**
1	City of Camarillo Demand Increase as % of 2010 Demand (from Table 5)	108%	98%	101%	103%	104%
2	MWDSC Supply Increase as % of 2010 Supply (from Table 6)	86%	98%	105%	99%	95%
3	MWDSC Supply as % of Demand (from Table 7)	113%	129%	135%	125%	116%
4	**Difference MWDSC Supply Increase and City of Camarillo Demand Increase (Row 3 – Row 1)**	**5%**	**30%**	**35%**	**23%**	**12%**

3. Multiple Dry Year Conditions

Table 9	City of Camarillo Projected Multiple Dry Year Water Demands				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Projected Average Year Demand (afy)	11,878	10,853	11,103	11,321	11,462
Increase Compared to 2010[1] (afy)	849	(176)	74	292	433
Increase Compared to 2010	8%	-2%	1%	3%	4%
Demand as % of 2010 Demand	108%	98%	101%	103%	104%

Notes:

1) Based on an 2010 Average Year Demand of 11,029 afy.

Table 10	MWDSC Projected Multiple Dry Year Supplies				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Average Year Supply[1] (afy)	2,248,000	2,417,000	2,520,000	2,459,000	2,415,000
Increase Compared to 2010[2] (afy)	(371,000)	(202,000)	(99,000)	(160,000)	(204,000)
Increase Compared to 2010	-14%	-8%	-4%	-6%	-8%
Supply as % of 2010 Supply	86%	92%	96%	94%	92%

Notes:

1) Based on the current supply programs as listed in Table 2-10 from the 2010 Regional UWMP.

2) Based on the projected supply capacity of 2,619,000 afy obtained from 2005 Regional UWMP.

Table 11	MWDSC Projected Multiple Dry Year Supply as Percentage of Demand				
Description	**2015**	**2020**	**2025**	**2030**	**2035**
Average Year Supply[1] (afy)	2,248,000	2,417,000	2,520,000	2,459,000	2,415,000
Average Year Demand[2] (afy)	2,236,000	2,188,000	2,283,000	2,339,000	2,399,000
MWDSC Supply as % of Demand	101%	110%	110%	105%	101%

Notes:

1) Based on the current supply programs as listed in Table 2-10 from the 2010 Regional UWMP.

2) Based on total demands on Metropolitan as listed in Table 2-10 from the 2010 Regional UWMP.

Table 12	Comparison of Supply and Demands under Multiple Dry Years					
Row	**Description**	**2015**	**2020**	**2025**	**2030**	**2035**
1	City of Camarillo Demand Increase as % of 2010 Demand (from Table 9)	108%	98%	101%	103%	104%
2	MWDSC Supply Increase as % of 2010 Supply (from Table 10)	86%	92%	96%	94%	92%
3	MWDSC Supply as % of Demand (from Table 11)	101%	110%	110%	105%	101%
4	**Difference MWDSC Supply Increase and City of Camarillo Demand Increase (Row 3 – Row 1)**	-7%	12%	10%	2%	-3%